Pack no. 1-3, 20+

LARGEST TELEPHONE CIRCULATION IN THE WORLD

Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, The American Telephone Journal, Sound Waves, The Telephone Magazine, and The Telephone

PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY, MONADNOCK BLOCK, CHICAGO

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Vitrified Fire-Clay
CONDUIT
Guaranteed Best
THE CLAY PRODUCT CO.
738 Stock Exchange Bldg.
Factory at Brazil, Ind. CHICAGO

CHAS. G. STEVENS CO.
BRIGHT COLD ROLLED AND COLD DRAWN
NORWAY IRON, MAGNET STEEL
Cold Drawn Steel—Rounds, Flats, Square, Hexagons.
COLD ROLLED STRIP STEEL
LARGE STOCK ALWAYS ON HAND.
58-60 South Canal Street, CHICAGO

McROY CONDUITS
CHICAGO
ROOKERY BUILDING

1889—Paris Exposition Medal for Rubber Insulation
1893—World's Fair Medal for Rubber Insulation
THE STANDARD FOR RUBBER INSULATION
OKONITE WIRE, OKONITE TAPE, MANSON TAPE, CANDEE PAT'D POTHEADS
OKONITE TRADE MARK REG. U.S. PAT. OFFICE.
THE OKONITE CO., Sole Manufacturers
253 Broadway, New York
WILLARD L. CANDEE, MANAGER
H. DURANT CHEEVER,
W. H. HODGINS, SECRETARY
GEO. S. MANSON, SUPERINTENDENT
W. C. CANDEE, ASST. SECRETARY

KERITE
Insulated Wires and Cables
1850 1908
The Insulation which has withstood successfully the test of half a century
W. R. BRIXEY, Sole Manufacturer
HUDSON TERMINAL
30 Church Street, NEW YORK

CHICAGO TELEPHONES SATISFY
CHICAGO TELEPHONE SUPPLY CO.
FACTORY AND GENERAL OFFICES
ELKHART, IND. U.S.A.

Save cross-arms by using our
"Standard" Aerial Rings

for supporting either aerial cable or insulated service wires. These rings are guaranteed not to slip on the supporting strand when cable is being installed. May be applied by ordinary gas pliers. Prompt deliveries guaranteed. In ordering state diameter of supporting strand used.
YONKERS SPECIALTY CO.
Yonkers, N. Y.

"DETROIT" RUBBER COVERED WIRES
Telephone Pair a Specialty
DETROIT INSULATED WIRE CO.
Detroit, Mich.

PLATINUM
Wire, Sheet, Rivets and Contacts
Send for Literature
BAKER & CO., Inc., Newark, N.J.
N. Y. Office: 30 Church Street

TELEPHONE CABLE
WATERBURY CO., 69 SOUTH STREET, NEW YORK CITY

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Peirce Specialty Company

ELKHART — ENGINEERS DESIGNERS MANUFACTURERS — INDIANA

Peirce Specialties

All Steel Pole Brackets — All Steel House Brackets
All Steel Transposition Brackets
Pole Seats (5 Designs) — Cross Arm Back Braces (Channel Steel)
Distributing Circles (3 Design)
Fastenings for twisted pairs — Expansion Bolts
Hammer Drills for Drilling Masonry
Test Connectors — Cable Hangers

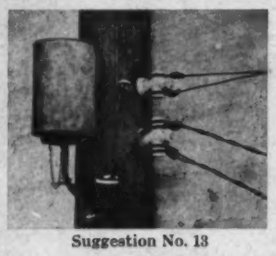
The Indiana Rubber & Insulated Wire Co.

MANUFACTURERS OF

PARANITE TRADE MARK

Insulated Wires and Cables

JONESBORO, IND.



Suggestion No. 13

Suggestion No. 2

UNIVERSAL INSULATORS

SOME ADVANTAGES:

A Separate Groove for Each Wire—Grooves for Any Direction—Universal—All Porcelain—Will Not Rot or Rust—Prevents Damage to Twisted Pair Wires—Reduces Maintenance.

Write for Descriptive Literature

Universal Specialty Company

116 S. Seventh St. Terre Haute, Ind.

We Make Toll Tickets by the Million

By means of new facilities just acquired, and thus produce them better and cheaper than can be done in small lots. We can furnish them promptly in any quantity, on better paper, put up in better shape, and at LOWER PRICES THAN EVER BEFORE OFFERED.

WE ALSO FURNISH

Lease Records — Directories
Toll Journals — Trouble Tickets
Toll Ledgers — Rental and Toll Bills
Monthly Check Reports — Voucher Checks
Cash Books — Card Index Systems
Steel Telephone Signs
All kinds of Blanks, Forms and Books for Telephone and Toll Line Accounting.

Write for Sample Forms and Prices.

THE TELEPHONE PRINTING COMPANY

DEFIANCE, OHIO

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Construction Material

GALVANIZED Telephone and Telegraph Wires, Cross Arms and Braces, Pins, Brackets, Insulators, Pole-Steps, Lag Screws, Clips, Machine Bolts, Carriage Bolts, Shims, Messenger Clamps, Lightning Arresters, Guy Anchors, Ground Rods.

Our Stock of Construction Material and Appliances is Complete and Adequate in Every Way. Send Us Your Orders.

Specify Okonite wherever a Rubber Covered Wire is needed.

OKONITE IT NEVER DISAPPOINTS

Central Electric Company.

264-266-268-270 FIFTH AVENUE CHICAGO

OKONITE IT NEVER DISAPPOINTS

If You Consider THE POOLE Lock-Out System

as an addition to party-line service, you are wrong. It is not something added—it is a feature which has always belonged to good service. It unfailingly gives absolute

SECRECY

to any of the parties on the line. It gives the subscriber all the advantages of a private line at the cost of a party line. It enables you to put more parties on a line, and get higher rates. Now, do you want details?

Mountain State Electrical Co.,

Wheeling, W. Va.

RUGGED AND EVER READY

OUR No. 51 JUMBO MAGNETO

None so powerful, none so desirable for heavily loaded rural lines

Get busy; we are ready, you should be

The Standard Telephone Mfg. Co., Portsmouth, O.

SUCCESSORS TO

The Williams Telephone & Supply Co.

The Drake Telephone Co. The Knox-Dickey Telephone Mfg. Co.

Write Us About Our Four-Party Common Battery Selective

QUALITY TELEPHONE CORDS

The word Quality in its broadest sense is descriptive of **STROMBERG-CARLSON** Cords for use with telephones and in switchboards.

Quality meaning excellence of materials and manufacture

Quality meaning rightness of textile design---braiding and insulation.

Quality meaning distinctiveness, individuality and superiority.

Stromberg-Carlson Braided Conductor Cords

are to be had appropriate for every form of telephone apparatus and electrical devices in a complete variety of forms and finishes, insulations and colors. Numbering over one hundred different types of Green Silk, Cotton and Worsted Telephone Cords, Braided Tinsel or Steel Conductor—Linen or Cotton Switchboard Cords and Cordage for any purpose. That their superiority is universally recognized is shown by the character of our continuous orders which govern a regular capacity output.

When you are thinking of purchasing—economically—think of STROMBERG-CARLSON Cords that last

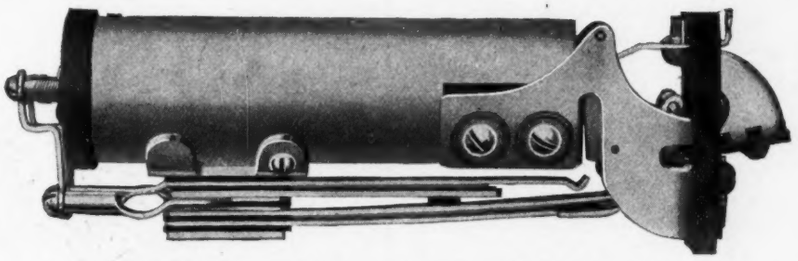
WE WANT YOUR ORDER ONCE—THEN INSIST UPON QUALITY CORDS THEREAFTER

Prices and Samples Upon Application

Stromberg-Carlson Telephone Mfg. Co.

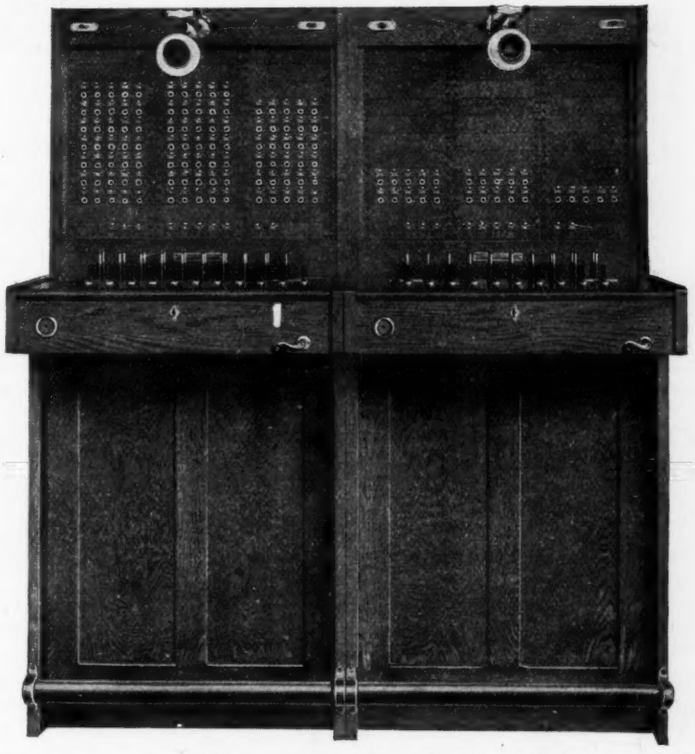
ROCHESTER, NEW YORK **CHICAGO, ILLINOIS**

No. 8 Self-Restoring Gravity Drop



150-Line Magneto Switchboard

TWO SECTIONS—UNIT TYPE—FOOT RAIL BRACKET



Quality Woodwork

¶ The only switchboard Cabinets that wear as well as they look. All made in our factory.

¶ The cable forms inside are neatly and conveniently arranged.

Quality Apparatus

¶ The kind of tool-made apparatus that lasts long after quality is forgotten.

¶ Every piece of apparatus in this board is "Quality Apparatus."

A 5360 Oak Switchboard Cabinet—Mission Finish

¶ To the Man-Who-Buys—the real question is: "What KIND of service is this switchboard going to give me five years from now?"

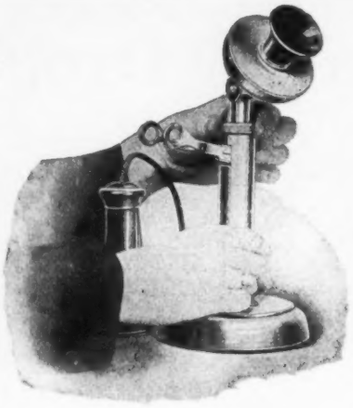
¶ *Ask yourself that* when you are selecting a magneto switchboard equipment.

¶ *Stromberg-Carlson* Magneto Switchboards are recognized everywhere as the very HIGHEST TYPE of strong, simple, clever construction, combined with most durable and lasting finish, PLUS the most efficient and economical Quality Apparatus that lasts.

Tell Us Your Needs—We Will Gladly Submit Prices

STROMBERG-CARLSON TEL. MFG. CO.

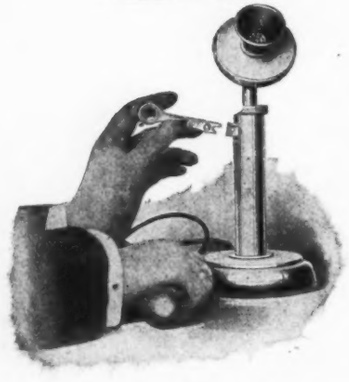
ROCHESTER, N.Y.-CHICAGO, ILL.



To inspect the hook switch, loosen the knurled nut at top of stem. You do this with your fingers; there are no mysterious "catches" or patent spring locks to monkey with.

As soon as the nut is loose, the casing may be removed. Now you can see every working part and every wire, and yet every part is operative. There is not a sliding contact in the stand. Every connection is soldered.

By removing one screw in the center of the base, the cord terminals are reached. These are of generous size, so you don't need a watchmaker's screwdriver to put in a new cord.



The hook lever is the part that usually "gets it" when the stand is knocked over, so we put this on with a screw. Another lever can be put on in an instant, as shown. No adjustments.

WHY do some stands pull apart into many different pieces? You can't test them when they are apart, and can't see the parts when they are together. What's the use?

Get our Bulletin No. 63

The Sumter Telephone Mfg. Co.

SUMTER, S. C.

The "Long Distance" Switchboard Transmitter

Clear, loud, distinct, no side tones—cannot "pack". Small, light and elegant. Lowest battery consumption.

LONG DISTANCE TELEPHONE MFG. CO.

SOUTH BEND, INDIANA.

Never Throw Away a Battery Cell

until you know that its days of usefulness are past. You don't know this in every case without the right instruments.

"Connecticut Pocket Meters"

should be in every trouble man's kit. They measure volts and amperes. Durable, accurate, inexpensive.

CONN. TELEPHONE & ELECTRIC COMPANY, Inc., Meriden, Conn.

Send for circular "T"

WESTON

Our Portable Instruments are recognized as THE STANDARD the world over. Our STATION VOLTMETERS and AMMETERS are unsurpassed in point of extreme accuracy and lowest consumption of energy.

Weston Electrical Instrument Company

Main Office and Works, Waverly Park, Newark, N. J.
London Branch—Audrey House Ely Place, Holborn.
Paris, France—E. H. Cadiot, 12 Rue St. Georges.
Berlin—European Weston Electrical Inst. Co., Ritterstrasse No. 88
New York Office—74 Cortlandt Street.

STANDARD PORTABLE DIRECT READING

VOLTMETERS, AMMETERS, MILLIVOLTMETERS, VOLTAMMETERS, MILAMMETERS, OHMMETERS, PORTABLE GALVANOMETERS, GROUND DETECTORS AND CIRCUIT TESTERS

Weston Standard Portable Direct Reading Voltmeter. Model 1.

Conceded by Everyone

FIRST—That each individual piece of apparatus must be so mounted in a telephone that it can be removed without taking the cabinet from the wall.

SECOND—That each individual piece of apparatus must be so mounted that it can be removed without interfering with any other piece of apparatus.

THIRD—That each individual piece of apparatus must be so mounted that it can be inspected and tested without removing or disrupting any other circuit connection.

Examine a Cracraft, Leich Telephone and you will know why they are meeting with such universal favor

OUR PRICES WILL INTEREST YOU

Cracraft, Leich Electric Co.

Genoa, Ill.

SUBSCRIBERS appreciate a telephone that is alive and ready to transmit the first as well as the last syllable the instant the receiver is removed from the hook.

Such a ready state of action exists when Cracraft, Leich Transmitters, Receivers and Induction Coils are used in connection with your talking circuit, and same are installed today on practically every type of telephone in use.

WRITE FOR PARTICULARS

Cracraft, Leich Electric Co.

Genoa, Ill.

THE No. 1 hookswitch is of the long lever removable hook type, particularly designed for the compact telephone—German Silver springs, platinum contacts.

The lightning arrester is self-contained. A heavy round carbon block with a large discharge surface is held at the proper distance from the grounding plate by a circular mica disc sufficiently perforated to insure good protection.

WRITE FOR PARTICULARS

Cracraft, Leich Electric Co.

Genoa, Ill.

ONE hexagon screw adjusts the armature of our ringer. Freezing contacts absolutely prevent sticking of the armature. The gong standards are riveted solidly onto the heel iron. The gongs are bored a trifle off center, and are adjusted by turning. When in proper adjustment, they are locked with double lock-nuts. Examine our gongs. They are brass and very heavy.

Our generators are important factors in establishing the high standard of our telephones.

You can depend on ringing every telephone on the line and the drop at central, when a generator of our manufacture is installed.

FURTHER INFORMATION UPON REQUEST

Cracraft, Leich Electric Co.

Genoa, Ill.

Increasing the Revenue

YOU can increase your percentage of net earnings in two ways—raising your rates for service or reducing your operating expense.

If you raise your rates you create dissatisfaction and you have more money to collect—to collect money costs money.

If you reduce your operating expense the public is satisfied and your saving is already collected—is clear, net gain.

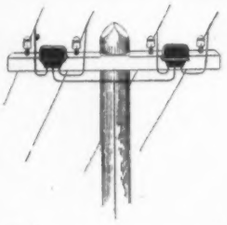
There are other arguments in favor of reducing the operating expense plan.

The Clement Automanual accomplishes everything in connection with it—and the character of service is improved.

Trade mark
AUTOMANUAL
Reg. U. S. Patent Office

The North Electric Company

DALLAS Cleveland KANSAS CITY



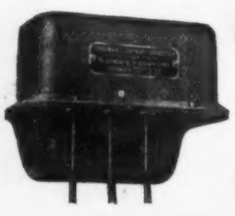
Don't Be Odd

Get in line and adopt Chapman Lightning Arresters as part of your equipment.

Speaking about lines, you know you don't have to cut your lines to install Chapman Arresters. They are simply bridged to the line and protect both sides of a metallic circuit, leaving a clean pair of talking wires.

Installed at intervals along a line, they form natural spillways for lightning and static accumulations.

Manufactured by



Minnesota Electric Co.

Minneapolis, Minn.

H. E. COBB, Selling Agent

1530 Monadnock Bldg. Chicago, Ill.

DESIGNED BY PRACTICAL MEN

The Sky Rocket Arrester

Made for practical work, and they do it right. Their mission is to protect your lines from charges of excessive potential whether due to lightning or other causes, and they fulfill this mission invariably and infallibly.
Details, prices and references await your inquiry.

CHANCE MANUFACTURING CO.

CENTRALIA, MO., U. S. A.

THE
BALLAST (B) EXPRESS
FOR COMMON BATTERY. FOR MAGNETO.

VOTE-BERGER

Switchboards have won First Awards at prominent expositions, and are receiving the stamp of approval by prominent telephone exchanges all over the country.

¶ In designing, not only the Ballast system, but also the Magneto Express Switchboard, there was but one thought in mind—Perfection. We know we have succeeded, others tell us that this is so. We want this success to be known broadcast; we want every telephone company in the world to know that Vote-Berger Switchboards stand above the maze of ordinary apparatus.

¶ The following letter of commendation was unsolicited, but furnishes a reliable guide for prospective switchboard purchasers.

THE VOTE-BERGER COMPANY, December 16th, 1907.
La Crosse, Wisconsin
Dear Sirs:—The Union Telephone Company of Prairie du Chien, Wisconsin, wishes to congratulate your company for the efficient equipment you recently installed for us in that city.
Much time was spent on our part, to convince ourselves of the best common battery system. We cannot give your board too much praise. The expense of power has been greatly reduced by changing from the magneto to central energy.
Very truly yours,
Union Telephone Company,
J. W. Callaway, President.
O. W. Sherman Sec'y & Treas.
J. E. Crary, Manager.

¶ The Vote-Berger Express Magneto Switchboard is absolutely reliable and simple in construction. Drops and jacks are small and compact, and can be taken from the board without the removal of a screw, or the breaking of any soldered connection. Any inexperienced person can replace burned out coils. The clearing-out drop, as well as the line drop, is self-restoring.

¶ If you are contemplating installing a new board, either Magneto or Common Battery, let us prepare specifications to suit your individual requirements. Or we will gladly send an experienced sales engineer, who can furnish whatever information you may need.

¶ Ask for our latest bulletins, pertinent to the Ballast and Express Switchboards.

The Vote-Berger Company

Makers of Telephones, Switchboards and Appliances

La Crosse, Wisconsin

"ROBERTS" AND WHAT IT MEANS

WHY

Limit Your Party Lines To Four Or Eight Parties on a Line?

WHY NOT

Put Twenty Or Forty Parties On A Line?

FORTY PARTY

Selective Ringing System Secret Service

FORTY PARTY

The ONLY LIMIT To The ROBERTS SYSTEM Is The TRAFFIC LIMIT

If YOU Want To Know MORE About The BEST Party Line SYSTEM On The Market

WRITE TO

HOMER ROBERTS TELEPHONE CO., 1703 Melrose St., Chicago

HOMER ROBERTS TELEPHONE CO.

1700 Melrose St. Chicago

Ever See a Better Fuse Connection?

Or as good a one?

Note the combination. Study the details.

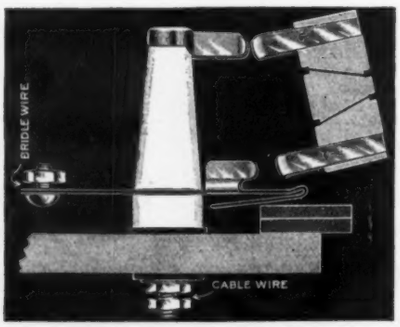
Made of porcelain, copper bronze, German silver, carbon and mica.

Means absolute protection. Is practically indestructible.

Now used for all terminal heads.

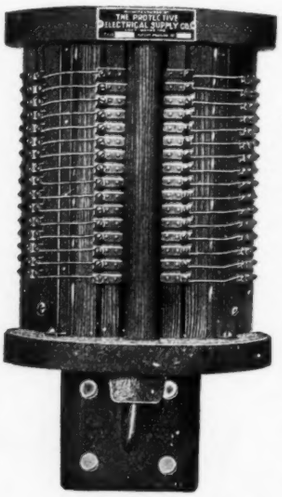
Get a sample.

Moon Manufacturing Company
18 South Jefferson Street, Chicago



DID YOU?

Ever figure what your Fuse Maintenance on Cable Terminals is costing you?



If Not, Do So

This can top Gable Terminal has no pot heads. No wiped joints and fuse. Cost but **5c per 100.** Better let us save you some money on your next terminal order.

GET OUR ILLUSTRATED BOOKLET

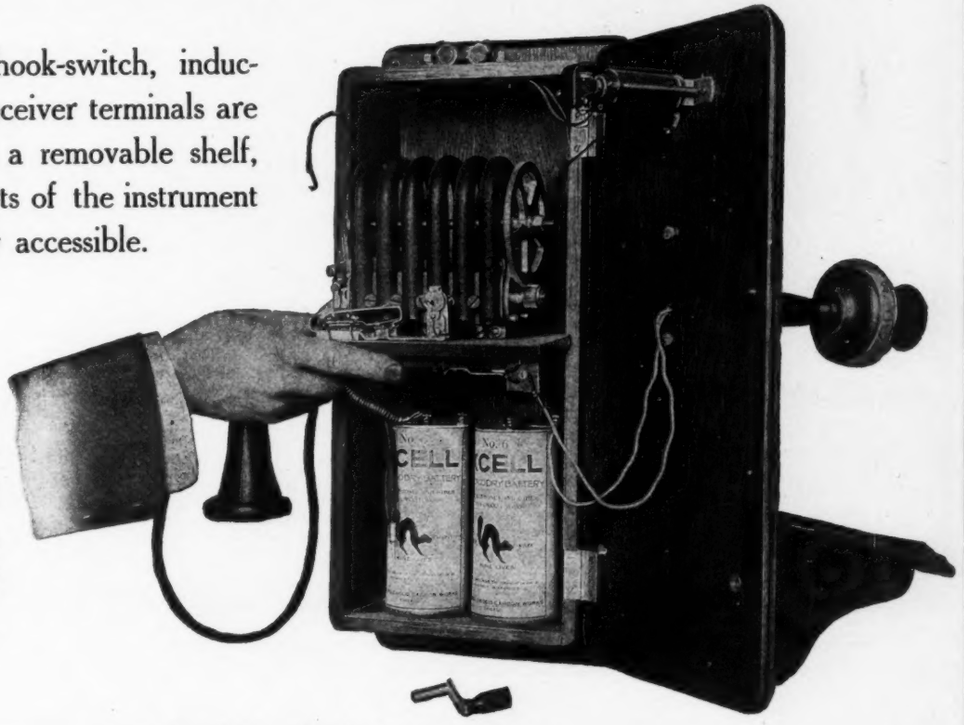
The Protective Electrical Supply Co.

FORT WAYNE, IND.

NEW 1908 MODEL No. 360

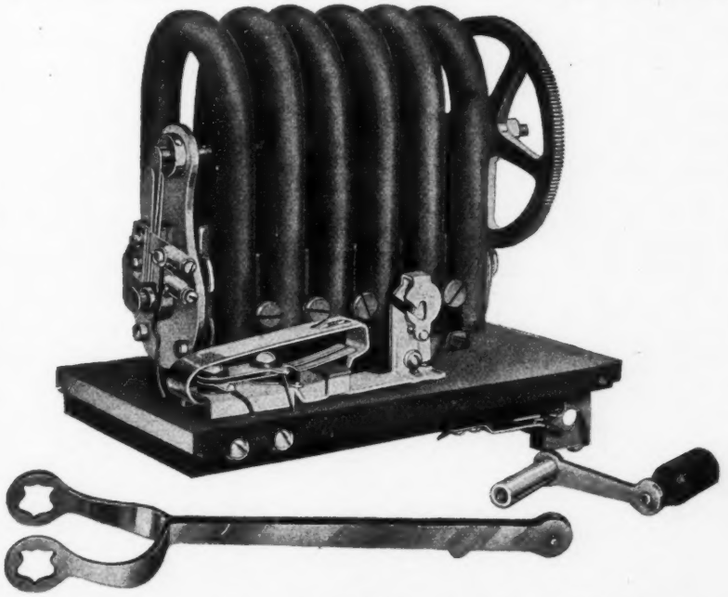
MAGNETO TELEPHONE

¶ Generator, hook-switch, induction coil and receiver terminals are all mounted on a removable shelf, making all parts of the instrument almost instantly accessible.



¶ Lightning arrester is self-cleaning — and includes five square inches of carbon surface.

Send for Bulletin and Prices



¶ 5 inches shorter than the "compact" type telephone— and all interior parts more accessible.

¶ No wiring except on shelf and that is all insulated.

¶ No hinge connections — ringer and transmitter connected with flexible cords.

American Electric Telephone Company

Manufacturers of Magneto and Common Battery Telephone Apparatus

64th and State Sts., Englewood Sta. **Chicago, Illinois**

What's the Matter

With This Telephone?

It is at the farthest end of a twenty mile line having 49 instruments on it.

It has been there twelve years without being taken down from the wall. Batteries have to be changed in it about every two years. It is in use every day.

There are a number of other makes of telephones on this same line, and many of them have to call up this one to have it ring Central for them, as they cannot get the operator two-thirds of the time.

The user of this telephone has never failed to get the operator, except once or twice when the line wire was broken in two.

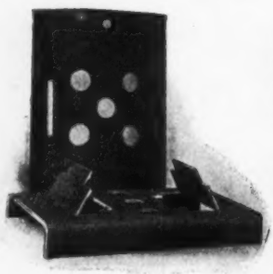
In other telephones on the same line, batteries average to last only from eight to twelve months.

Great difficulty is often found in ringing Central, and ringing others on the same line, but not with this telephone. In the 12 years it has been in service, not one cent has been spent on it for repairs.

This is the Andrae Special Heavy Giant Bridging Telephone, the strongest ringing and talking instrument that has ever been produced, backed by a ten year guarantee. At the end of five years' use, it will be found to be a very inexpensive instrument. While others have big repair bills charged up against them, this will have none. Change in batteries is not needed so often, and on the whole, it is a moneymaker from the start. The material and workmanship are both of the highest class that the world can produce. Give us a chance to prove it by letting us send you a couple on trial.

Julius Andrae & Sons Co. 49 years in business Milwaukee, Wis.

BELDEN STEEL GAINS



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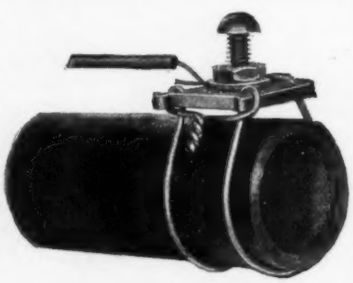

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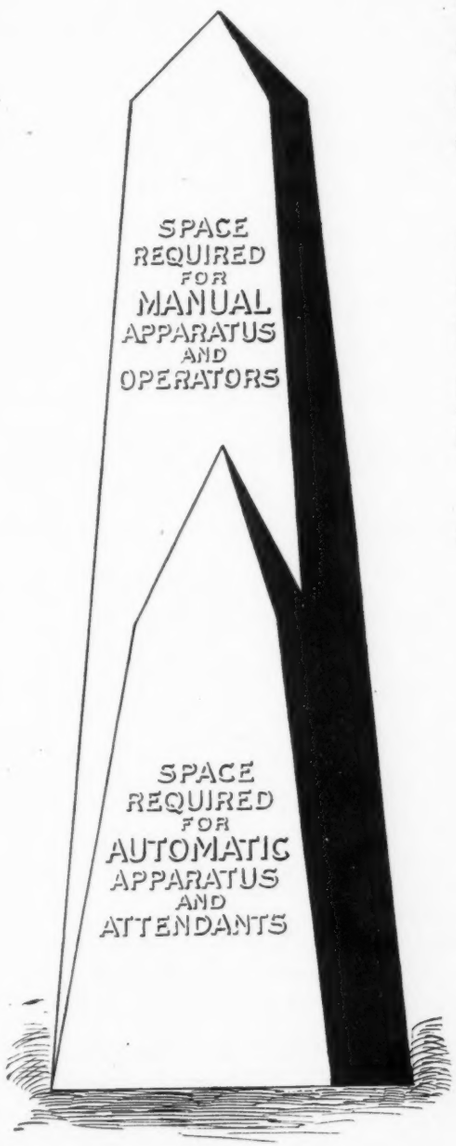

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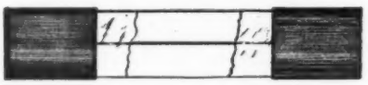

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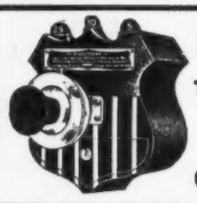

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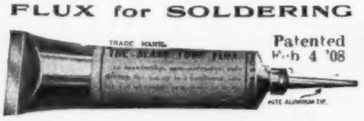
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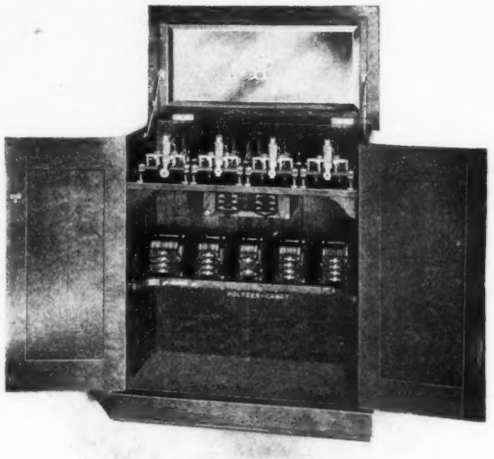

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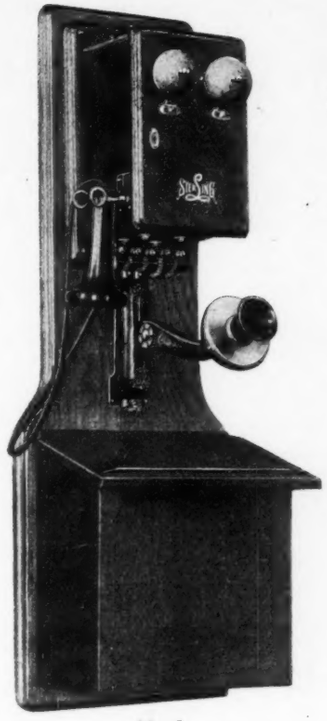

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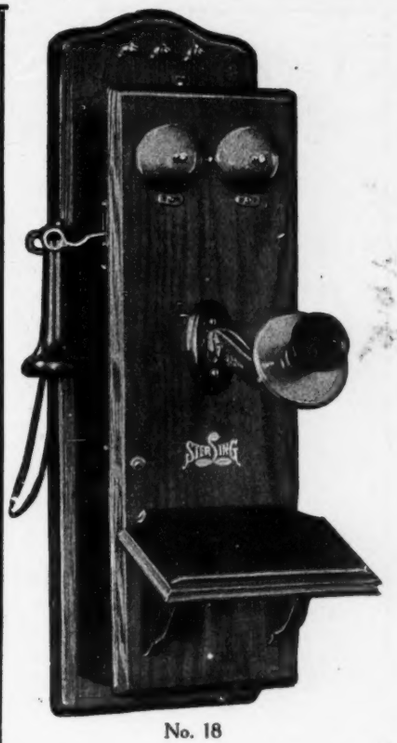

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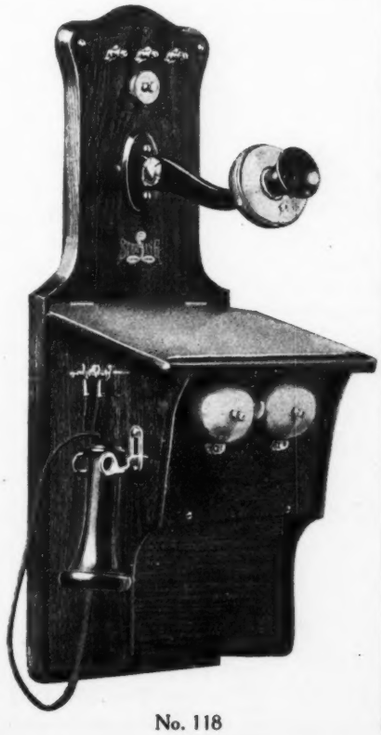

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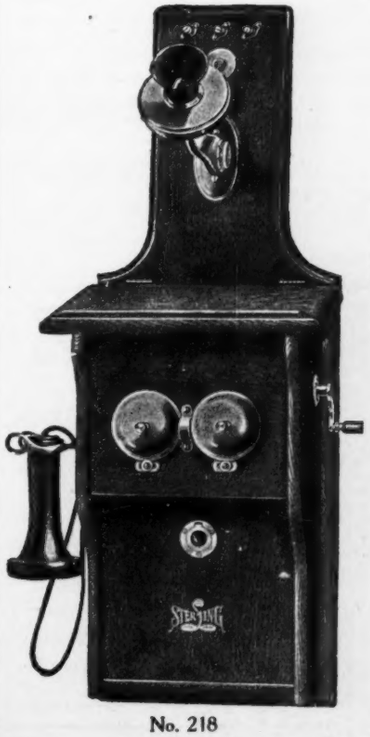

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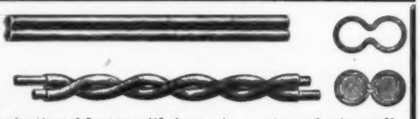

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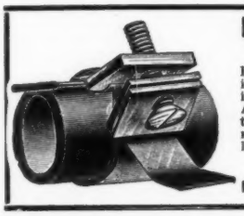

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THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Sound Waves, The Telephone and The Telephone Magazine

Vol. XVI CHICAGO, SATURDAY, SEPTEMBER 5, 1908 No. 4

PUBLISHED EVERY SATURDAY BY THE

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Vol. 32	Telephone Magazine	No. 4
Vol. 18	American Telephone Journal	No. 10
Vol. 16	Sound Waves	No. 4
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CHICAGO, SATURDAY, SEPTEMBER 5, 1908

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Going Ahead.

The bigness of the telephone business is a fact that has only recently begun to make its full and proper impression on the minds of the men who are in it. Even some of the best informed officers and managers are a little hazy on figures showing its size, and the average citizen, who can reel off statistics on railway mileage, bank capitalization, and baseball scores with ease, is hopelessly at a loss when asked how many telephones there are in the country. Yet, if we have not all the figures down pat, we are gradually building up statistical records, and impressing them upon the public mind. And, as time goes on getting better and better acquainted with one another, as telephone men. We are finding out what the other fellows are doing, and rather admiring it. Then we go home, and instead of feeling disappointed because we are unable to get money on easy terms to make that extension which people are demanding —and willing to pay for—we look at some other business. A few weeks ago people in other businesses were not figuring very much on making extensions. So we see that the telephone business is a better business than most, and even the public knows that it is very nearly the biggest business in the country.

Of course, it is going to keep on growing—rapidly, too—for a long time. And the Independent telephone men have taken on their shoulders a good sized job when they undertake to educate the public to co-operate with them by taking their service and supplying the money to build their new lines, as well as to educate their employees to spend their money very wisely and carefully in order to get the best value for every dollar paid out by the company.

Conventions and informal meetings, as well as friendly correspondence, all play their part to unite the Independent telephone men into a close body of fellow workers. These spread the good ideas that bring in business, save money and make for good plants and first class service. But telephone men have long been alive to the value of a journal, published at a central point, which can gather each week the good ideas and the important news, alike from the manufacturing and operating fields, and present live information to the entire field at one time, and promptly. This is the work of the new TELEPHONY.

Most telephone men are familiar with the results secured by its predecessors. *The Telephone, The Telephone Magazine, Sound Waves* all were useful, and all grew and flourished by the loyal support of the Independent operators and manufacturers. But, as the business increased in size, its needs advanced, and our readers are familiar with the mergers which

made the old *Telephony* and *American Telephone Journal* each a big, successful and useful journal for the industry. But the bigness of the industry demands the services of a journal which is of the largest and strongest, able to use to the best advantage the co-operation which it will receive from every side. And we believe that in the new TELEPHONY the industry has such a journal. Now, the man who has a new idea to spread, whether about a manufactured product, or some method or result of operation which will be helpful, can be sure of reaching all the telephone men who are enough interested in the business to read about it, and reaching them within a week. If an Independent manager wants to help other Independent telephone men, or get information from them, he need be in no doubt about the best method of getting in touch with them.

We are looking for great advances in the progress of our companies during the next few years. And these will come about largely through closer co-operation. Men in the field tell us that the logical medium through which this co-operation will be made evident is through TELEPHONY. And with all the advantages of the experience and traditions of our past growth to help us, we are ambitious and ready to do our part.

The Simplicity of Complication.

A boy was once standing beside a large dynamo in a power house watching its running with great interest. His curiosity was aroused as to the way in which it generated the current. Presently he asked an attendant:

"How does that dynamo make electricity?"

For answer the attendant picked up a U-shaped bar of iron and a piece of wire and turning to the boy asked:

"Do you know what a magnet is?"

Yes, the boy knew.

"Well, suppose this horseshoe is a magnet. The space between its ends is very magnetic. If I make this wire into a circle and drop it over one leg of the magnet the wire will cut through the magnetism and generate a current of electricity in the wire. That is the same thing the dynamo does, but it is arranged so the wire can keep on moving without stopping."

No matter how complicated a machine or system may be, it can be resolved into a number of very simple parts. If you ask a man to explain some such thing, he will nearly always begin by calling attention to some very simple proposition or law. Upon these simple things the whole matter rests. Attention to this fact will help those who have difficulty in studying out and understanding the working of complicated telephone circuits.

It is a natural mistake to try at once to see how a circuit acts by tracing the path of current under operating conditions. In the simpler diagrams this may do very well, but in many manual and automatic circuits another method will lead to a clearer understanding with fewer mistakes and greater ease. This plan is to first examine the construction of each part of the assembled apparatus. Get the resistance of each relay and its characteristics clearly in mind. All special relations and actions should be noted. One relay may be quick-acting and another sluggish. One may have its contacts 'make-before-break," while another is the reverse.

Then notice the work which each part has to do. A certain relay contact may feed battery current to some coil, or a key contact may connect an operator's set. Get these relations so well in mind that the sight of the contacts suggests to you the work which it performs. Do not be in too great a hurry, for here is where the greatest results are to be obtained by thoroughness. The object is to get the simple relationships so thoroughly fixed in the mind that a thorough knowledge of the apparatus will help on the study of other circuits also.

Next, get the normal conditions in mind, imagining all parts to be at rest. See if current is flowing anywhere, or if it is ready to flow in certain paths when action shall begin. Then trace the current flow and resulting action when the receiver is lifted from the hook, the dial turned, or whatever else is necessary to start things moving. Take care to include every possible path and every possible action, rejecting any of them only after satisfying yourself that the conditions prevent their coming into the consideration. Then the result, once attained, is more than likely to be final.

The longer one studies and works with complicated circuits and apparatus the simpler they seem. They are actually as involved as ever, but the mind has become trained in analysis —in seeing the simple parts of the complex whole. There was a young man who had been trained in an automatic exchange, never having worked on the manual. At one time he was called on to make some slight repairs to a common battery manual board. He did the work successfully, but returned with relief to the other system, saying that the manual was too complicated for him! We may differ from him in his conclusions, but the effects of continued application are evident.

Money Enough in America.

Monopoly is clearly enough a step toward socialism. And now we have the promoter of the telephone monopoly idea taking another great step in the scale of useful or harmful progress. This time it is toward the brotherhood of nations. On another page we chronicle the listing in London of a large amount of its bonds, following the listing of stocks which was announced some time ago.

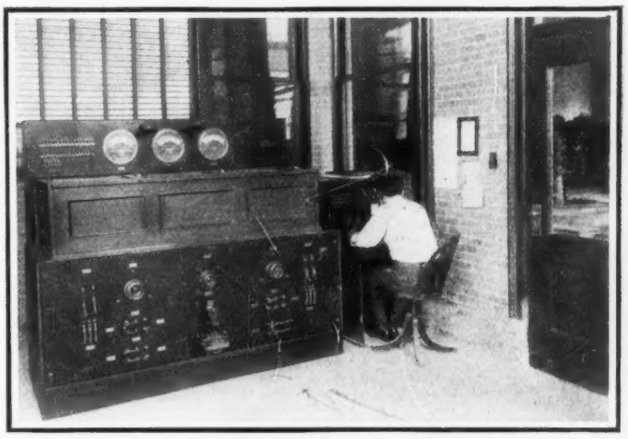
But, if monopoly were natural, would not the people of the United States believe in it? They put their trust in a great many natural things—such as building homes, raising families, work, pleasure and religion. And into these natural things in which they believe, they put their money. People of sense who find it natural to be investors in a business, pick out, after due investigation, what they consider to be a good business and invest in it. Many thousands have found that their inclinations led them to invest in Independent telephone companies. And once their money was in, they have kept it there, and as a rule they have received good returns annually, while the security has grown in value. So they are investing more of their funds in, and advising their friends to buy telephone stocks and bonds. And these American people, and their friends, who all want telephones, have money to pay for them, and for the lines and exchanges and the salaries of the men and women to keep them going. There is plenty of money in America for all for this. But the monopoly project is being financed abroad. This means an attempt at limited control, partly foreign, of a necessity of modern American life. Is this natural?

Telephone Control of New York's High Pressure Fire Service

By S. R. Edwards

The adverse factors entering into the problem of fighting fires in business districts of large cities have increased with the number of buildings, and the work has also been rendered very difficult on account of the height of the buildings which have been erected within the past few years. In order to cope successfully with fires in the congested business districts of the cities of New York and Brooklyn there has recently been installed a new system which in time will undoubtedly do away with the use of fire engines. A system of high pressure water mains, with hydrants distributed at frequent intervals throughout the congested business and the heavy factory districts, and along about three miles of the water front has been devised. These mains are connected to high pressure pumping stations, of which there are two in New York and two in Brooklyn. These stations are located outside the limits of districts in which the fire risk is at all hazardous, and the conflagration cannot practically affect either station, and certainly not both stations, either in New York or Brooklyn. In New York one station is located at the northeast corner of Gansevoort and West streets, and the other at the northwestern corner of Oliver and South streets. In Brooklyn the main station is located on the water front at Furnham and Joralemon streets, and the other station, known as the reserve station, is located at Willoughby and St. Edwards streets. All these stations are equipped with electrically driven, multi-stage centrifugal pumps. Under ordinary conditions the water is obtained direct from the city's fresh water supply. In case of a shortage of water in the case of a great conflagration the North and East rivers can be drawn on for an additional supply.

In fighting fires by means of this high pressure water system the telephone plays an important part, as through it the amount of water which is desired at any point is controlled. Private branch exchange switchboards are installed in each of the pumping stations, and connections made to call boxes which are distributed at frequent intervals throughout the districts which the high pressure water system protects. As shown in the illustration, the telephone equipment in the pumping stations is very compact, the entire equipment occupying but a small space. The equipment of stations located at Gansevoort and West streets consists of a 40 line switchboard, and slate panel carrying the necessary fuses, switches, etc., for properly charging the storage battery, duplicate sets of which are mounted in the oak casing shown above the panel. The slate panel, supported by an iron framework, carries the voltmeters and ammeters and also fuses for the various switchboard circuits. On the right of this panel, drops are mounted for indicating fuses which are blown, thus facilitating the replacing of fuses. A large panel located on the wall immediately over the



Switchboard and Apparatus for Water Pressure Control.

storage battery contains a list of all the call boxes which are connected with the station.

The fire recording apparatus is mounted in a corner near the switchboard. When the alarm comes in the upper gong sounds. The number of the box is recorded on a paper tape by the instrument shown on the extreme right of the shelf, which punches a series of holes in the tape. The time and date of the alarm is printed upon the tape by the instrument to the left of the boxes, and the tape is wound upon the roll shown at the left of the shelf.

Although every alarm of fire is recorded by this apparatus, the high pressure water system is not used at every alarm. In a good many cases the fire is easily extinguished, but in case the

Telephone Order Brings Instantaneous Increase to 18,000 Gallons of Water a Minute.

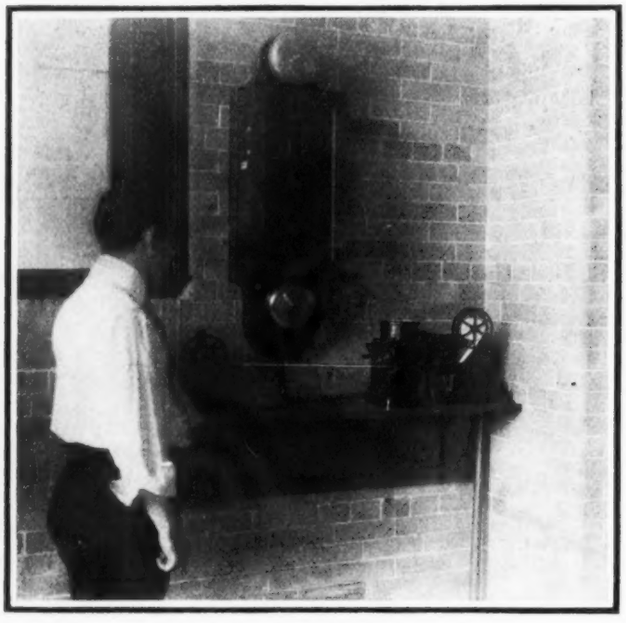
At an Ordinary Working Pressure, Which Can Be Increased Almost Instantaneously.

chief in charge thinks it advisable to use the high pressure system he immediately goes to one of the telephones in a call box and tells the telephone operator at the pumping station what water pressure he desires in the high pressure system. The telephone operator makes a memorandum of the pressure desired on a blank provided for that purpose, and gives it to the engineer in charge of the pumps. Space is provided on the forms for recording the time the order was received, and the time the pressure was changed.

The switchboard is equipped with five pairs of cords, 30 line circuits, and also several trunks or tie lines which connect with the other stations, with fire headquarters, and with the private branch exchange switchboard of the Edison company. The Edison company furnishes current for driving the motors connected to the high pressure pumps, and it is imperative that there be an instantaneous system of communication between the pumping stations and the source of power supply. The Edison company has private lines connected to each power station of the Edison system, so that current can be obtained at all times on the shortest notice.

The current for the switchboard is furnished by the storage battery, which is charged from the lighting system.

The telephone stations in the district served by the high pressure mains are mounted in small iron pole boxes similar to the type used by the police department of New York. These boxes



Fire Recording Apparatus.

are usually mounted on the walls of buildings, and are so arranged on party lines that no two adjacent boxes are connected to the same circuit. The reason for this is that in case one box is out of order and communication cannot be had with the pumping station, the next nearest box, not being on the same circuit, would almost certainly be in working condition. The switchboard at Gansevoort and West streets has 99 of these call boxes connected to it, while 115 call boxes are connected to the switchboard at Oliver and South streets. In Brooklyn 58 boxes are connected to the switchboard at the main station and 54 to the reserve station. The tie lines connecting the switchboard are laid in different ducts and every precaution, by means in some cases of duplication of parts, is taken to prevent any possible interruption to the service. In case of fire, the chief upon the scene calls the pumping station and instructs the telephone operator as to the pressure, which regulates not only the amount of water, but also the height to which a stream can be thrown. The pressure of the water can be changed from 200 lbs. to 300 or 400 lbs. per inch inside of three minutes, thus furnishing a very effective means of fighting fire.

Engineers of the telephone company are now at work developing a portable extension which can be attached to the call boxes. It is intended to have about 500 ft. of wire connected to this portable set, so that the chief may be present at the actual scene of the fire, and from the ground regulate the amount of water which is being turned upon the fire. It is also proposed to install a signaling system similar to that used on steamships for the purpose of communicating between the pilot house and the engine room, to enable the telephone operator to communicate immediately with the engineer in charge of the pump of the station by causing the display of a signal indicating the desired pressure.

Although the high pressure system has been in use but a short time, it is working very satisfactorily and it is predicted that in time the fire engine will be a thing of the past. In a large degree, the success of the system depends upon the use of the telephone.

The Indispensable Telephone.

In pushing the sale of an article in which he had implicit faith an ardent advertiser in a periodical used these words: "We could more profitably dispense with the telephone than with the ———— is the statement of," etc., etc. The advertiser in question and the article of which he thought so well do not matter particularly. The point is that in casting around for a necessity of every day use with which he could compare his wares and give people an idea of just how valuable an article he had to sell he selected the telephone. This action on the part of the advertiser was a great tribute to the telephone as an indispensable feature of modern life. Presumably he did not so intend it, as his purpose was to boost his own goods, but the inference to be drawn from his statement is too plain to be ignored.

"Better than wheat," and "better than gold" are phrases often used, not to discount either wheat or gold, but to magnify the worth of other things. So "more indispensable than the telephone" is a saying that is a strong testimonial to the instrument that has come to fill so large a part in the world's work. Just how vitally important it has become to the people is seldom realized until service is withdrawn.

Prompt Service; Courteous Treatment.

On the title page of the *Pacific Telephone Magazine,* published at San Francisco by the Pacific (Bell) Telephone and Telegraph Company, and edited by Mr. Willis Brindley, there appears the following:

OUR AIM

To furnish Reliable and Prompt Telephone Service. To Deal Courteously with Everybody.

An entire page is devoted to an exposition of this platform of prompt service and courteous treatment, so that all employes of the company will see it, and appreciate its importance. There is no doubt but that this declaration sets forth most concisely and with exactness what should be the aim of every telephone man: to aid his company to furnish reliable and prompt telephone service and deal courteously. This is the sum and substance of the business, fair rates, of course, being understood. Each operating company might well have printed cards bearing this motto and post them up in prominent places, and the manager has ample opportunities to impress on all employees the business value of prompt service and courteous treatment.

Long Distance Telephone Exchange Equipment*

General Discussion of a Central Office Installation for Long Distance Telephone and Telegraph Lines

By C. F. Saenger

The line panels of the test board illustrated in Fig. 26 of the preceding section of this article are equipped with line jacks for eighty toll lines. The Morse panel is equipped with jacks for forty-eight battery taps, divided up as follows: Ten 120-volt positive, ten 120-volt negative, ten eighty-volt positive, ten eighty-volt negative, four forty-volt positive, four forty-volt negative, twelve sets of automatic telegraph repeaters and twenty-five telegraph loops.

In Fig. 27 is shown the wiring of the line jacks. The left hand jacks are terminals for the tip and sleeve of the line side and are used for receiving the plugs of the line side of the composite or simplex sets terminating in cords and plugs, when the line is used for Morse service or for making tests. In the right hand jacks terminate the tip and sleeve of the switchboard side, and these are used for receiving the plugs of the drop or switchboard side when the line is used for Morse service. The middle jacks are for the use of the wire chief should he desire to use the line at the same time it is being used for Morse service. The extra contact on the sleeve jack is for operating the busy signal on the toll board.

Fig. 28 shows the complete wiring of the Morse panel, including Morse loops, repeaters and battery taps. On account

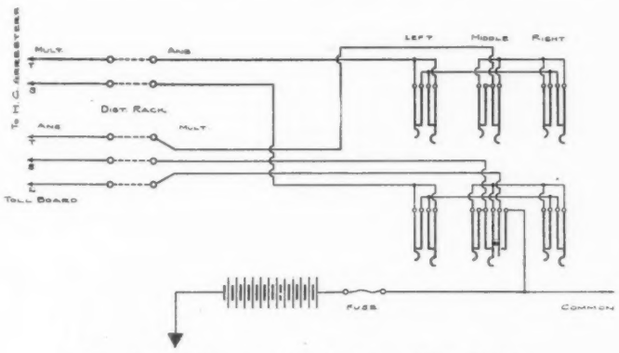


Fig. 27. Wiring of Line Jacks on Test Board.

of the difficulty experienced in constructing an efficient triple wound relay, it was found best to change the circuit somewhat, and the circuit shown in Fig. 29 was finally adopted and installed for Morse loops. The windings of the double wound relay are in series with both sides of the line and must balance absolutely; failure to produce a perfectly balanced relay will result in the armature following the impulses sent over the line, giving false signals. This signal apparatus is used for the purpose of signaling the wire chief in case of interruption to Morse service. The subscriber operates it by grounding one side of the circuit through a push button, which unbalances the line, energizes the relays and lights the signal lamp opposite the subscribers' loop. The locking relay in multiple with the lamp signal is also energized, and, locking itself, holds the signal until released by the wire chief on the depression of the nonlocking plunger release key. The wire chief answers such signals by plugging into the

* Continued from the September issue of TELEPHONY.

"looping in" or middle jack of the battery tap, Fig. 30, feeding the circuit, with the double or "looping in" plug of a Morse testing set. The usual method of connecting these loops is to insert the Morse leg of a composite or simplex set, which terminates in cords and plugs, into one of the jacks, and one end of a short cord with a plug on each end, into the other

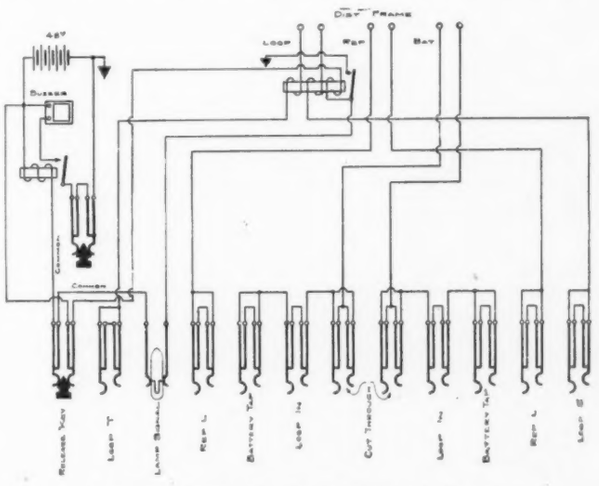


Fig. 28. Complete Wiring of Morse Panel.

jack. The free end of the short cord is then inserted into the left hand jack of the battery tap (Fig. 30.) The right hand jack of the battery tap is used for cutting off the battery should the wire chief wish to change to another tap of a different polarity or strength, or ground instead of battery,

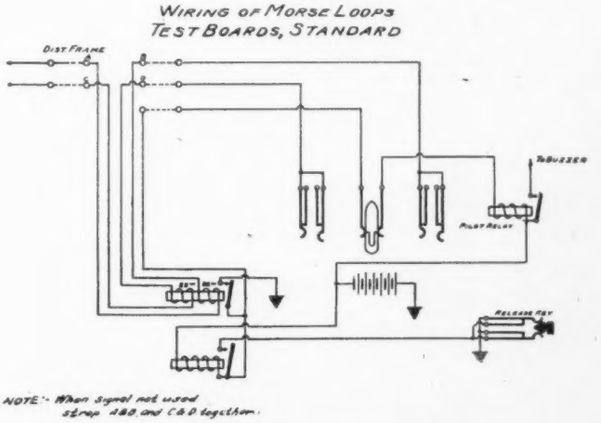


Fig. 29. Circuit Finally Adopted for Morse Loops.

or connect direct to another circuit without either battery or ground. The middle jack is used for cutting in on a circuit with a Morse set for answering a loop call or for any other occasion requiring the wire chief's attention.

Fig. 31 shows the arrangement of the jacks for automatic telegraph repeaters. The upper right and left hand jacks marked "R-1-L" are connected to the left hand of the set and the lower right and left hand jacks marked "R-1-R" to the right hand half. These sets are connected in the same manner as described for the loops.

Fig. 32 shows the apparatus and circuit arrangement of the

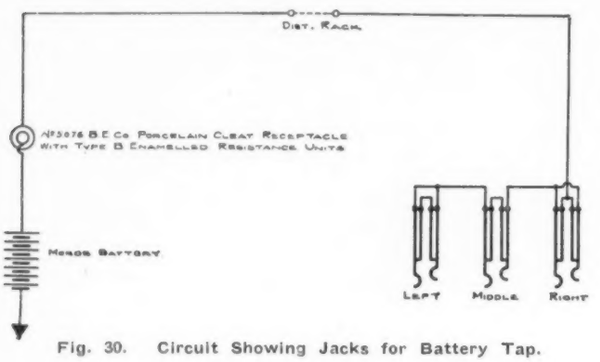


Fig. 30. Circuit Showing Jacks for Battery Tap.

Morse testing sets. The single plugs are used for testing for trouble when ground or battery is required to complete a circuit. The double plugs are used for looping in on battery taps, or when it is desired to connect the set in series with some circuit without ground or battery. The sounder cut-out key is used for opening the local circuits when the service of the sounder is not required.

Fig. 33 shows the circuit arrangement of the telephone sets and the cord circuits. The two end positions are equipped with five cord circuits each, three terminating in twin plugs and two in double plugs. The middle position is equipped with four, two terminating in twin and two in double plugs. The twin plugs are used by the wire chief for connections through the line panels, the double plugs are used for answering or making calls over incoming and outgoing trunks. Each cord circuit is provided with a ringing key and a key for listening in on a circuit either with or without the secondary side of the induction coil of the telephone set. All telephone sets are of the suspended transmitter type, the transmitters being adjustable in a vertical direction by means of cord weights and pulleys on the transmitter arms. The usual head telephone, cords, plugs, and jacks are used. The set is also provided with a transmitter battery cutout key.

The circuit arrangement of the wire chief's outgoing trunks

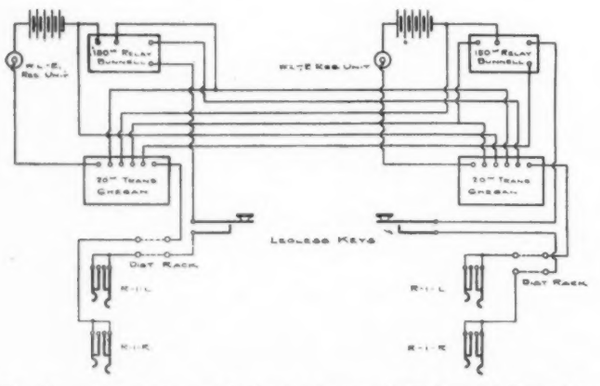


Fig. 31. Arrangement of Jacks for Automatic Telegraph Repeaters.

is shown in Fig. 34. It will be noted that all of the signaling apparatus is on the test board side, and that it is not necessary for the wire chief to ring when making a call. The extra contact operates the calling and busy signal when the plug is inserted. The double wound impedance coil attached to the inner contacts of the calling jack is for the purpose of operating the supervisory relay on the answering cords. The regular toll line answering jacks, calling lamps and busy signals are used for the answering jacks and calling signals, but the toll line signaling apparatus is not used in this circuit as the trunks are not multipled.

The line and battery terminals of the bridge and galvanometer set terminate in cords and plugs, and are multipled at the extreme ends of the cabinet so that they can be readily connected with the toll lines or trunks when required to locate trouble. The battery leads are wired to jacks in the jack rail in the extreme ends of the cabinet for use when making measurements. The terminals of the voltmeter and ammeter are also wired to jacks mounted in the jack rail so that voltage and ampere readings can readily be taken.

The face of the cabinet and the key board are illuminated by six 16 c. p. 110-volt lamps with green glass shades, mounted on three double brackets above the frieze board.

(To be Continued.)

How the Company Is Financed.

By Geo. S. Houston.

While there is nothing that is more vital to a telephone company than its finances, there is hardly any feature of the business which is less understood by the ordinary employee.

Ordinarily the telephone company has but two methods of ob-

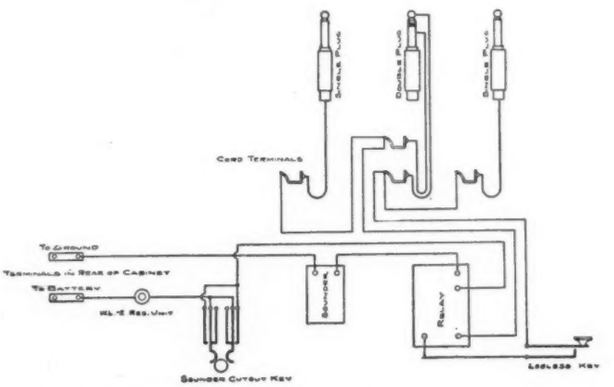


Fig. 32. Circuit and Apparatus of Morse Testing Sets.

taining money. One is from its rentals, and the other is from selling its stocks and bonds. The bonds of the company bear the same relation to the plant of the company as the mortgage on a man's house does to that property. A bond is the fractional part of a mortgage placed by the telephone company on either the whole or a part of its property for the purpose of raising money. Suppose the telephone company wants to raise $100,000 and for some reason does not wish to issue or sell stock. It will put a mortgage of $100,000 on its plant, but as there is always considerable difficulty in finding a purchaser for a $100,000 mortgage, in order to make the sale of the mortgage more easy, it divides the mortgage up into one hundred $1,000 parts, or one thousand $100 parts, or in any way it sees fit, and sells these divisional parts or bonds. It does not really divide the mortgage up, however. What it actually does is to deposit the mortgage with some trust company, called "the trustee," and sell the security represented by the mortgage. It is the trust company's duty to foreclose the mortgage in the interests of the purchasers of the bonds should the principal or interest not be paid when it comes due.

The purchaser of a bond stands in the same relation to the company as though he held a mortgage on the company for the amount represented by the par or face value of the bond, except that he cannot take any action toward foreclosing. This must be done by the trust company. The purchaser receives a cer-

tain rate of interest on the bond, which is figured on its par or face value, and not on the price he paid for it. He may have bought a $1,000, 4 per cent bond due in 1928 for $950, but his interest will be 4 per cent on $1,000. He will be getting $40 per year on an investment of $950, or a little over 4.2 per cent. If he holds the bond until the time it is due, he will get $1,000 for the bond for which he only paid $950, and thus will be getting $50 in addition to the interest which he has received. In

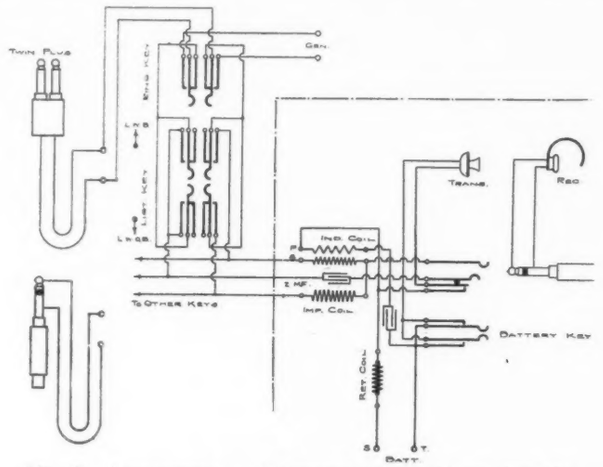


Fig. 33. Arrangement of Telephone Sets and Cord Circuits.

other words, on his original investment of $950 he has received interest to the extent of over 4.2 per cent per year and $50 additional. This really makes the yield to him higher than 4.2 per cent per year. By a complex method of compounding interest, it is shown that he really receives nearly 4.4 per cent per year.

The telephone company is willing to put a mortgage on its plant so that it can sell bonds, or in other words, borrow money at a low rate of interest. The buyer of the bond buys it on account of the security afforded his money by the mortgage held by the trust company. He cares more for the security of his principal and interest than he does for large returns on his money. The buyer of the mortgage receives no higher rate of interest on the par value of the bond than is printed there, no matter how prosperous the company becomes. Its prosperity does not interest him in any way, except that it makes his bond more safe. If the company did not prosper it might finally go into the hands of a receiver, and while he would be the first to be paid, after the employees, it might happen that a sufficient amount of money could not be realized by the sale of the plant to pay off the mortgage, in which case he would lose part of his principal. If the bond he held was secured by a second mortgage, deposited with the trust company or trustee, the bonds secured by the first mortgage would be paid before the bond he held. If the sale of the plant realized enough to pay off both the first and second mortgages, all the bonds secured by these mortgages would be paid in full.

The purchaser of stock in a telephone company does not lend his money to the company; he purchases a partnership in the business. If the company is prosperous, he gets his share of the profits according to the amount of stock he holds. If the company is not prosperous he doesn't get anything. If the company fails, he gets his pro rata share of what is left after the employees and bond holders have been paid in full. He is different from an ordinary partner, though, because, in most states, he is not liable for the debts of the company beyond the face value of the stock he holds. In an ordinary partnership, each and every partner is liable for all the debts of the company.

There are very often two different kinds of stocks, the preferred and the common stock. Each share of the preferred stock usually receives a limited or fixed percentage of the earnings; that is, when there are any earnings after the interest on the bonds is paid. If the stock is "cumulative," the dividends which he should have received, but may not have got, will be paid when the earnings of the company justify it. If, for instance, he holds a 6 per cent cumulative preferred stock and the first year did not get any dividend, and the next two years only received 4 per cent, if on the fourth year the earnings are large enough after the interest on the bonds are paid, he should receive, not only the 6 per cent for the fourth year, but the 6 per cent for the first year and the 2 per cent for each of the next two years, making in all 16 per cent. If the stock is not cumulative, the amount left unpaid each year will not be carried forward. It is lost forever to him.

If the company is a prosperous one, the earnings may be large enough so that the interest on the bonds will be paid, the regular dividends on the preferred stock also be paid, and there may still remain quite a large balance. This is where the common stock comes in. The common stock takes what is left over after everything else has been paid. Its dividend is usually not limited. In lean years it gets nothing, and in fat years it may get lots. The dividends on the preferred stock are usually a fixed amount, and no matter how prosperous the company is, the preferred stock gets only that rate. The dividends on the common stock are limited only by the earnings of the company, and in very prosperous companies runs to large percentages, often as high as 25 per cent. In case of dissolution of the company, the bonds and preferred stock are paid out of the proceeds of the sale, and if there be anything left, it is divided up among the common stock holders.

Semi-Annual Meeting of Oklahoma Telephone Association.

At the semi-annual meeting of the Oklahoma Telephone Association, held at Oklahoma City on Aug. 10 and 11, the subjects of "Relations of Mutual and Commercial Companies;" "Farmer Party Lines," and "Rates, Service, and Construction," were discussed at length. It was conceded by all that many features of the business should be made standard and uniform as soon as possible. An idea which met with general favor in discussion, and which can be followed to advantage in all exchanges, is that "it is the duty of every telephone man to do what he can to make the general public better acquainted with the exact workings of the telephone business, as it is a public utility with which more intelligent people are in direct touch than any other one thing in the world."

Incidental to the regular routine work of the convention,

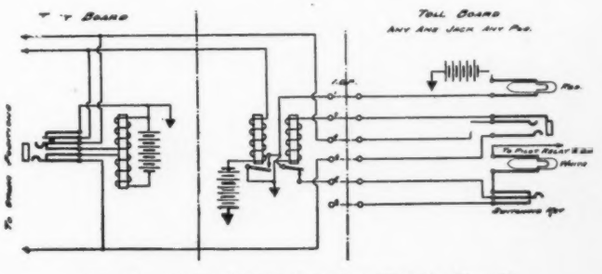


Fig. 34. Wire Chief's Outgoing Trunk Circuit.

steps were taken to change the time of meeting to the second Tuesdays of February and August, respectively, instead of Mondays, as this would give all members time to get to the meetings without traveling on Sunday.

A much appreciated feature of the meeting was an address by Col. Sidney Suggs, of Ardmore, on the benefits of a telephone system, in which he clearly demonstrated to those present that if every town had a "Col. Sidney Suggs," the telephone question would soon be settled satisfactorily to the subscriber as well as the operator.

Merger of Important Ohio Telephone Companies

Announcement has been made at Columbus, Ohio, that a new company is being formed which will operate, under lease, the properties of the Columbus Citizens' Telephone Company, the Cuyahoga Telephone Company, of Cleveland, and the United States Telephone Company, the latter operating long distance lines. The new company, it is said, will have ample capital and among the men prominent in its organization will be those who have long been identified with the progress of the Columbus Citizens' Company and the Independent movement in Ohio.

On the completion of this merger announcement will be made of the withdrawal from the telephone field in Ohio of E. M. Moore and H. A. Everett, who for 12 years have been prominently identified with the leading Independent telephone companies, and also of the withdrawal from the United States and Cuyahoga companies of James S. Brailey, Jr., of Toledo, their president.

Options already taken on the United States and Cuyahoga companies provide for a guarantee of the interest on the bonds and the payment of the regular dividends on the preferred stocks of these corporations, and in the case of the Cuyahoga company, the payment of 4 per cent on its common stock each year for five years and 5 per cent annually thereafter, and on the common stock of the United States company the payment of 3 per cent dividends for five years and 4 per cent annually thereafter. The proper maintenance and extension charges of the two companies are well provided for and the options are subject to the audit of the accounts and the physical examination of the properties by the leasing company before the options are taken up. These examinations are now being made, the audit being under way and the physical examination ready to begin.

At a meeting of the board of directors of the Columbus Citizens' Telephone Company the organizers of the leasing company presented a proposition to the board for a lease on the property of the local company on the basis of a guarantee of the fixed charges of the corporation, the preferred dividends and 5 per cent dividends on the common stock, payable 1¼ per cent quarterly, and also the payment of the 5 per cent dividends on the stock of the Franklin County Telephone Company, which dividends are now guaranteed by the Columbus Citizens' Company. A special meeting of the stockholders of the Columbus company will be held on Sept. 28 for the authorization of the lease.

It is understood that the majority of the stock of the new leasing company will be offered for subscription to the Independent telephone companies of Ohio at its money cost, on the same basis as that on which the original promoters of the new leasing company come in, and the balance of the stock of the new company will be offered to the stockholders of the three companies leased prorata to present holdings on the same terms.

Sufficient of the stock of the new company will be sold to produce $1,000,000 in cash to be invested in bonds of the United States Telephone Company, the Cuyahoga Telephone Company and the Columbus Citizens' Telephone Company, or such other securities as the lessors may select. These securities are to be deposited with the Cleveland Trust Company of Cleveland as trustee to secure the rentals and the performance of all other provisions of the leasing contracts. So long as the leasing company performs its contract duties, it is to have the right to the income from the securities so deposited.

The financial history of the companies entering into this merger is as follows:

The Columbus Citizens' Telephone Company was organized in 1898 by the Everett-Moore syndicate and later was sold to local men, who have since been in control. It has $650,000 of 5 per cent bonds due in 1922, and $750,000 of 6 per cent preferred stock and $750,000 common stock outstanding. On the latter, 4 per cent dividends were paid for some time, but since the first dividend period of this year, 5 per cent, at a rate of 1¼ per cent quarterly, has been paid. It owns its exchange and office building, and has about 12,000 telephones in operation. It uses automatic equipment.

In addition to its main exchange building, it has three branch exchanges. It operates under lease the 3,000 telephones of the Franklin County Telephone Company, guaranteeing 5 per cent dividends on the $150,000 of stock of the latter company. H. A. Lanman is president, E. R. Sharp secretary and treasurer, and among its directors are some of the best known merchants and bankers of Columbus.

The Cuyahoga Telephone Company has exchanges in Cleveland, East Cleveland, South Brooklyn, Newburg, Collinwood, Dover, Rocky River, Nottingham and Chagrin Falls, and also a number of toll stations in other Cuyahoga county towns. It operates about 22,000 telephones and has 25-year franchises dating from 1898. It has $3,000,000 of bonds, $1,500,000 of 6 per cent preferred stock, and $1,500,000 of common stock. On the latter 1 per cent quarterly was paid until late last year, since which time no dividends have been paid on it. James S. Brailey, Jr., is president.

The United States Telephone Company was organized in 1898 and has $2,156,000 in 5 per cent bonds, $852,500 of 6 per cent preferred stock and $3,100,000 of common. On the latter ¾ of 1 per cent was paid quarterly until last year, since which time no dividends have been paid on the common stock. It has over 12,000 miles of long distance lines, and connects with over 300,000 Independent telephones. It controls by stock ownership the Youngstown Telephone Company, the Stark County Telephone Company, the Zanesville Telephone and Telegraph Company, the Columbiana Telephone Company, the Findlay Home Telephone Company, the Citizens' Telephone and Message Company of Fostoria, the Massillon Telephone Company and the Lancaster Telephone Company. James S. Brailey, Jr., is president of this company also.

Commenting on the merger, the Columbus *State Journal* says: "The deal is one involving large interests and affecting the telephone business over the entire state. The capital has practically been provided and the arrangements for the safeguarding of the interests of the stockholders of the leased companies is believed to be as perfect as can be made. The men who will be in charge of the new company are conservative and there will be no inflation of securities or watering of stock, but the deal will be made on purely business principles and will add much to the strength of the Independent telephone companies of the state."

A. T. & T. Takes Its Bonds to Europe.

It has just been announced that the $100,000,000 American Telephone convertible 4 per cent bonds have been listed on the London Stock Exchange. This is officially stated to be the sequence of the action taken by the company in October, 1907, when the stock was listed on the London board. It also is a logical sequence of the unreasonable attacks on telephone securities which have been spread broadcast in the newspapers of America, and have caused undue suspicion of the value of investments in the telephone business.

Comparative Costs of Brick and Concrete Manholes

By Clarence Mayer

The question whether to build brick or concrete manholes for telephone conduits has been discussed by many engineers and construction men without coming to a definite decision. Some hold that brick manholes are cheaper to build and better suited for telephone purposes, because they are more easily intersected than concrete manholes, and also because in many instances the design and dimensions of standard manholes must be changed on account of obstructions encountered, such as sewers, water mains, gas mains and foreign conduits. On the other hand, the advocates of concrete manholes contend that they may be as readily intersected as brick, and even a large hole, as where an opening is made in the side of a manhole for additional ducts, may be neatly patched by a common laborer; whereas, the services of a bricklayer would be required for patching a brick manhole. It is admitted that while it is true that concrete manholes are not practicable where on account of obstructions the design and dimensions of standard manholes must be changed, still in other cases concrete manholes are cheaper to build and more quickly constructed.

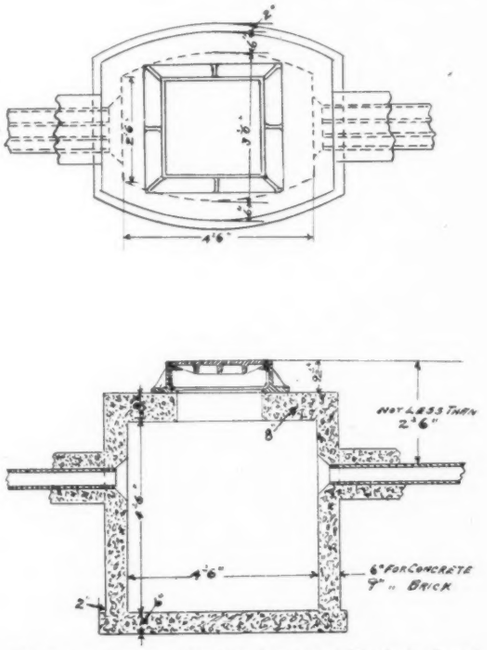


Fig. 1. Plan and Section Showing Standard Manhole Construction.

Experience based on cost records has shown that concrete manholes are more easily and cheaply intersected than brick, and the question which to build should as a rule be decided by the cost.

An instance showing the advantage of concrete manholes occurred on a conduit job where the excavations for manholes were made in fine sand and water, such as is encountered in the northwestern part of Indiana. The holes were sheeted, and a pump attached to well points was kept in action while the excavations were in progress, and until the walls of the brick manholes were built. The well points were withdrawn at about 6 p. m., two hours after the walls of the manholes were completed. The following morning nothing was left of the manholes except a puddle of sand, water and bricks. Concrete manholes were then installed, the forms shown in Figs. 2 and 3 being used in building the walls. These manholes withstood the action of the sand and water, although the well points were withdrawn less than two and one-half hours after the concrete for the walls was placed.

In this article the costs of building brick and concrete manholes are given, and the forms used in building concrete manholes are shown. The costs are based on work done under the supervision of one foreman, and on jobs where similar soil and conditions were encountered. The following specifications are given as showing the method of construction, design and dimensions for the manholes on which the costs given in the tables are based.

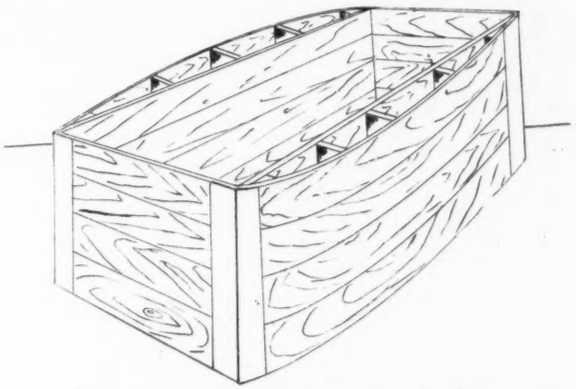


Fig. 2. Wood Form for Concrete Manholes.

Manhole Construction.—The excavation for a manhole shall be made to such a depth as to bring the concrete tops seventeen and one-half inches below street grade. The excavations for a brick manhole shall be sufficiently wide and long to leave a space of six inches around the outside wall of the manhole when finished. In stiff clay the excavation may be made of the outside dimensions of the manhole. A manhole shall be either of brick with a concrete bottom, concrete top and cast iron frame and cover, or of concrete throughout, with cast iron frame and cover. In size it shall be approximately of the inner dimensions specified on the plan of the work, Fig. 1.

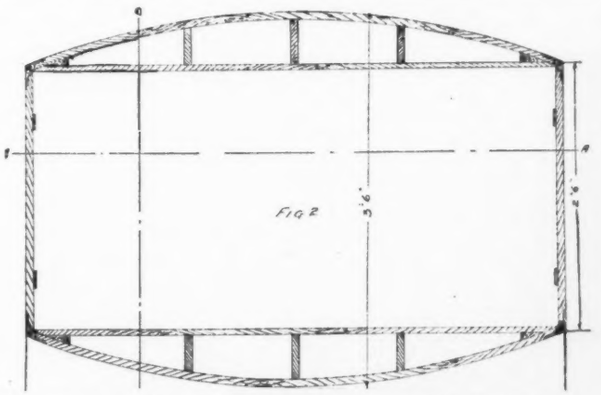


Fig. 3. Plan of Wood Form for Concrete Manholes.

In constructing a manhole the bottom of the excavation shall first be tamped and a layer of concrete of the depth shown on

Fig. 1, and of sufficient width and length to project two inches beyond the foundation courses of brick or the bottom of the concrete wall, shall be placed, tamped and graded for drainage. Where possible the manhole shall be drained by a six-inch sewer "P" trap in the bottom of the manhole with six-inch sewer tile connection to the sewer. All drainage openings shall

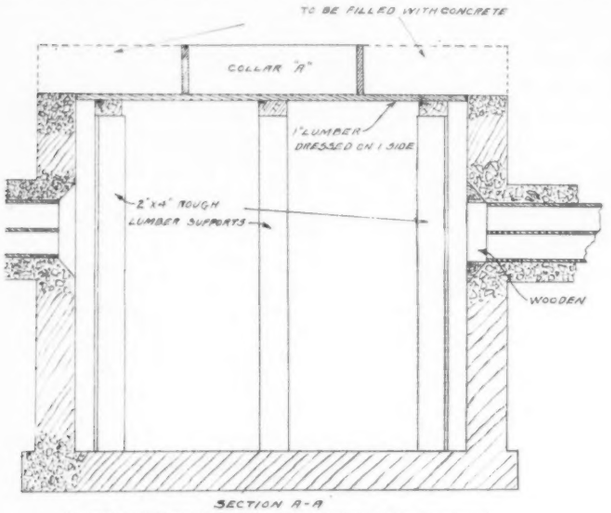

TO BE FILLED WITH CONCRETE
COLLAR "A"
1" LUMBER DRESSED ON 1 SIDE
2"X4" TOUGH LUMBER SUPPORTS
WOODEN
SECTION A-A
SHOWING METHOD OF FORMING FOUNDATION FOR TOP OF VAULT

Fig. 4. Section Showing Method of Forming Foundation for Vault Top.

be provided with cast iron strainers set flush with the floor or wall of the manhole. Where the manhole is drained through the floor, the floor shall be laid so as to drain to the trap with a fall of not less than one inch in ten feet.

In brick manholes, the wall of the manhole shall be built of hard burned sewer brick laid in cement mortar. The wall shall be nine inches thick and built up, every sixth course being laid as headers, to the height required. The top course shall be laid as stretchers. The horizontal mortar joints shall not exceed one-half inch and the vertical joints three-eighths inch in thickness. The brick work shall be racked away around the entrance of the ducts to afford room for turning cables when installed. All pipes entering the manholes shall be well cemented into the brick work and the inside of the manhole wall well pointed up.

The walls of all concrete manholes shall be six inches thick. The concrete in the roof and floor shall be thoroughly tamped.

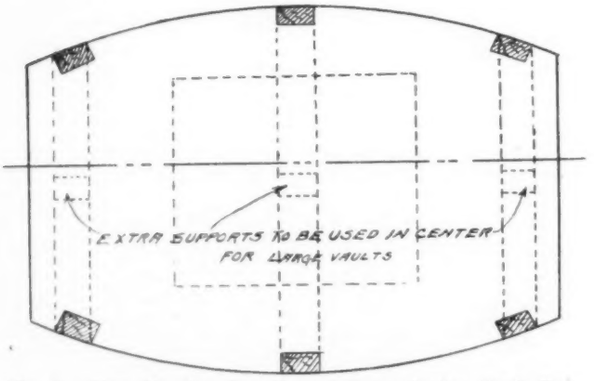


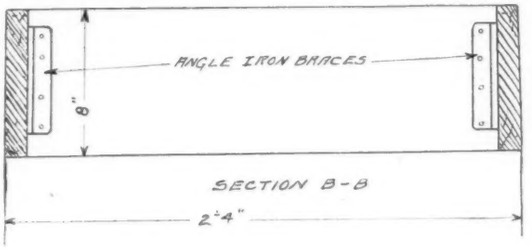
Fig. 5. Plan Showing Location of Supports for Vault Top.

The concrete in the walls shall be uniformly and equally distributed within the forms and thoroughly tamped in place.

When the wall of a manhole is finished and filled in around the outside, the wood form for the concrete top shall be placed. The form shall be placed so as to make the center of the manhole opening as nearly as possible over the center line of the ducts, going both ways, and midway between the ends of the manhole; the long edge of the opening being parallel to the main line of conduit. The method and forms used in building tops for brick or concrete manholes are shown by Figs. 4 to 6, inclusive.

The proportions of concrete mixtures for manholes shall be as follows. If crushed stone concrete is used: For floors of manholes, one part American Portland cement, four parts one-quarter inch screenings and eight parts No. 3 three-quarter inch stone; for roofs and sides of manholes, one part American Portland cement, three parts one-quarter inch screenings, and five parts No. 3 three-quarter inch stone. If gravel concrete is used: For floors of manholes, one part American Portland cement, four parts sand and eight parts of gravel; for roofs and sides of manholes, one part American Portland cement, three parts sand and five parts gravel.

Cement mortar shall be mixed on a closely laid timber platform or in a wood box. The sand shall be spread on the mixing platform to a thickness of two inches, the cement added and evenly distributed and the materials turned over three times with hoes. Sufficient water to make the mortar into a stiff paste shall then be added and the mixture turned over three times with hoes to thoroughly mix the material and dampen



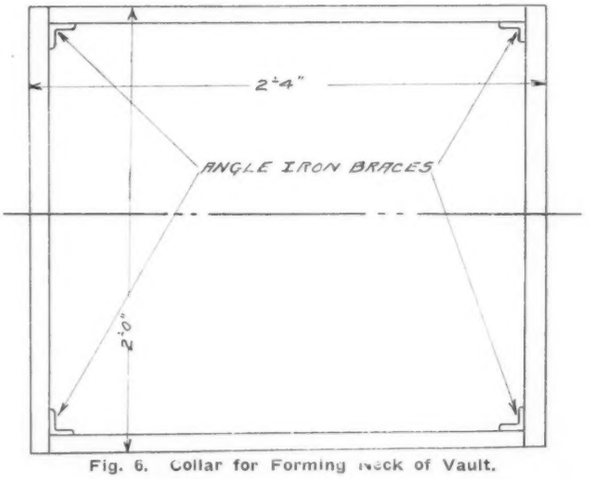


Fig. 6. Collar for Forming Neck of Vault.

every particle of cement. Mortar shall be mixed in the proportion of one part American Portland cement to three parts sand.

Cost Data.—The rates of wages on which the data given in the cost tables are based are as follows:

	Per day of 9 hrs.
Foreman	$3.50
Assistant foreman	2.50
Timekeeper	2.25
Watchman	2.00
Water-boy	1.00
Laborers	2.00
Teams (including driver)	5.00
Bricklayers, per hour	0.65

In the following tables the cost of concrete is based on cement costing $1.73 per barrel, and sand and gravel costing

$1.90 per yard delivered on the work. The teaming and labor cost of unloading cars containing cement, frames and covers, and distributing them on the work is included in "Cost of Unloading and Distributing Materiai." All other material was bought delivered on the work. The cost of time spent by foreman, assistant foreman and timekeeper in supervising the work and keeping accounts, and the cost of time spent on the work in general, such as time of watchman and waterboy, are included in "Cost of Supervision. The costs of sewer connections are not given in these tables, as they vary greatly, depending upon the relative position of manhole and sewer; and in some instances no sewer connections are made.

Table 1 gives the average material and labor cost of brick manholes of design and dimensions shown by Fig. 1.

TABLE 1.

Average Material and Labor Cost of a Brick Manhole, Based on Cost of Building 17 Manholes in Clay Soil.

Quantities and Cost of Material:	
.4814 yard concrete for bottom at $3.98	$ 1.92
.3866 yard concrete for top at $4.29	1.66
.864 yard mortar at $5.42	4.68
960 bricks at $8.50	8.16
1 frame and cover	11.74
Total material cost per manhole	$28.16
Cost of unloading and distributing material	.64
Labor Cost:	
Cost of teaming	2.79
Cost of excavating	4.42
Cost of mixing and placing concrete for bottom	.81
Cost of laying brick	10.91
Cost of placing frame, and mixing and placing concrete for top	3.52
Cost of supervision	2.84
Total labor cost per manhole	$25.29
Total cost per manhole	$54.09

(To be Continued.)

The Use of Telephones for Giving Time Signals.

An interesting use of the telephone in connection with a system for transmitting time signals, has been recently suggested by E. Guyou in a memoir presented to the French Academy of Sciences. A similar method has been used for some time by Dr. Rieffler in his laboratory at Munich for accurately signaling time to any subscriber to the Munich telephone system.

This method presupposes that a standard clock is fitted with an electric seconds contact, and that there is a special battery for a local circuit. After each second, the low tension current is interrupted during a short interval by the contact of the clock. As, however, one of the sixty teeth of the contact wheel has been removed, there is an interruption at second "o," thus signaling the beginning of each minute. The local current will actuate a simple beating relay situated on the telephone apparatus somewhat below the transmitter mouthpiece.

Whenever a subscriber calls up to ask the exact time, the relay circuit is closed by a switch arranged beside the telephone apparatus, after which the caller perceives distinctly in his telephone receiver the beats of the relay armature. The relay beats are far more energetic than the pendulum oscillations of a clock, and are distinctly heard up to distances of several hundred miles.

As the standard clock is arranged in an air tight glass case, being daily checked chronographically by about a dozen similar clocks installed in the same laboratory in similar air tight cases, it is readily made to keep time to about one-tenth of a second, an accuracy quite sufficient for all purposes, as the capacity of the ear to distinguish the beats would not warrant a higher sensibility.

In order to maintain the accurate working of the standard clock, its variations are compensated by controlling the air pressure inside the glass case. Whenever these variations attain any material figure, the clock is readjusted by a special electric outfit operated from a distance, the beats of the pendulum being accelerated or slackened by adding additional weights above or below the center of gravity as may be required. This method is now used in general practice for signaling time once or twice weekly to many telephone subscribers at distances of up to several hundred miles from the standard clocks.

Another use of the telephone made by Dr. Rieffler is for transmitting time signals from a clock installed at the Royal Observatory to the clocks in his laboratory. The clock at the Royal Observatory is provided with an intermittant seconds contact alternately closing and opening the circuit for one second. The contact wheel is fitted with thirty teeth, one of which has been removed to signal the beginning of the minute. This time transmission takes up about fifteen or twenty minutes daily, as carried out over the telephone wire.

Discipline in the Successful Operating Room.

By W. B. Bentley.

Telephone companies having from 2,000 to 5,000 subscribers, or more, have long since learned that it pays to have a first class chief operator in charge. One who thoroughly understands the kind of discipline to be maintained in an operating room and can enforce it, is the person to be in control of the service. The same high grade of discipline should be maintained in an operating room where there are only four operators as where there are 50 or more. It is all nonsense for managers and owners of telephone plants to say, "This is a small exchange and the same discipline cannot be maintained as in a large exchange." Until they get that idea out of their heads the service will never be first class. There have been known exchanges of from three to four hundred subscribers, where at times a visitor would think from the things going on in the operating room that he was present at a party being given at some private house. The fault, in such cases, is all with the chief operator, who is responsible for the conduct and discipline of the operating force and for the efficiency of the service rendered by that force to the public. The same statement applies to any assistant left in charge during the absence of the chief operator.

An operating force requires constant supervision at all times. "Visiting" between operators and social conversations over the wires between operators and subscribers, if permitted, will cause the service to become very slow and unsatisfactory. A quiet operating room, where the operators are working quietly and all speaking in low tones, gives the chief operator, the supervisors, and the trouble clerk the minimum amount of work, as everything is always going smoothly, giving the subscribers no cause for complaint. But if complaints to the chief operator are made by subscribers, they should be received in a courteous manner at all times, and careful attention given. It is bad policy to ever contradict the subscriber; let him understand that his word is taken for what occurred. When investigation is made it is a good plan to let the operator believe the chief thinks the error occurred just as the subscriber stated. When both sides of the complaint are investigated, he may put the stories together and report back to the subscriber the facts. If the fault is with the operating, he should not be afraid to acknowledge it.

Some chief operators overdo discipline by being too severe. This has a tendency to make the operators nervous, and more liable to make mistakes. A pleasant smile and a good word about her work from the chief operator will make many an operator work, and try her best to make the service better.

The chief operator who can have in his force good discipline at all times, see that careful ringing is done, that signals are at all times answered promptly, responses properly made, and connections put up with promptness and accuracy, will be giving the service promised by the contract department. This is why the management is interested in operating room discipline.

The Preservative Treatment of Loblolly Pine Cross-Arms*

By W. F. Sherfesee

Chief, Office of Wood Preservation, U. S. Forest Service.

All who are familiar with wood preservation know that the ease with which the preservative can be injected depends upon the character and condition of the wood. Porous species, such as red oak and certain pines, absorb the liquid more readily than such dense woods as tamarack and hemlock. In a single species, timber cut from open-grained fast-grown trees takes treatment more readily than that from trees which grow slowly, with a consequent close grain; porous sapwood receives the liquid more readily than the denser heartwood, the pores of which are more or less filled with oils and other infiltrated organic substances; and wood is easier to treat when dry than when a large amount of water in the cells presents a mechanical resistance to the entrance of the preservative. In small timbers, which receive an absolute penetration, the difference in absorption is more apparent than in the treatment of large dimension stuff, merely the outer layers of which are impregnated.

The cross arms manufactured throughout the South are cut mainly from rapidly grown, open-grained loblolly pine. No distinction is made as to species, however, and shortleaf and longleaf are frequently included. At present cross arms cut from various parts of the tree are mixed indiscriminately; hence cross arms cut from heartwood are treated with those cut from sapwood, and those which have reached an air-dry condition with freshly cut or rafted material. As a consequence, the amount of the preservative forced into the wood varies greatly; the dry sapwood material receives more than is required and the heartwood not enough.

PRELIMINARY TESTS.

These conditions induced the Forest Service, in February, 1903, working in co-operation with the American Telephone & Telegraph Company and the Norfolk Creosoting Company, to make a series of six experimental runs at the latter company's plant near Norfolk, Va. The principal objects of this test were to demonstrate the inequality of the treatments received by different classes of material and to furnish a basis for more detailed work in the future, with a view to rendering the treatments more uniform and economical.

For creosoting under pressure, the timber is piled in small trucks or buggies, hauled into large, air-tight horizontal cylinders, and the doors tightly closed. Live steam is then admitted for varying lengths of time, usually for from three to six hours, according to the character and dryness of the wood. The steam is then expelled and a vacuum drawn for several hours to exhaust the air and water remaining in the wood cells. Creosote (dead oil of coal tar) is then allowed to run into the cylinder from one of the storage tanks. When the oil appears in the overflow pipe, indicating that the cylinder is full, force pumps are started, and the resulting pressure is maintained in the cylinder until the desired amount of oil per cubic foot of timber has been forced in. This amount has previously been calculated for the entire load, and when the indicator on the storage tank shows that the required amount of oil has been drawn from the tank the supply is shut off, and that which remains in the cylinder is forced back into the storage tank. The treated load is left to drip in the cylinder for a short time, and is then hauled out and unloaded.

* Abstract from Circular 151 issued by the Forest Service.

GRADING THE ARMS.

Before the treatment was begun 14,000 arms were separated into three classes, in accordance with the relative amounts of heartwood and sapwood each arm contained. Class A was composed of arms with 75 per cent or more of heartwood; Class B, 75 per cent or more of sapwood; and Class C contained less than 75 per cent of either heartwood or sapwood. No attempt was made to separate the arms according to the amount of moisture they contained, hence nearly green and partially air-dry arms were represented in the same class. Six runs were made in these preliminary experiments. In order to ascertain the exact absoption of oil, a number of arms of each class were weighed before treating and so marked that they could readily be identified and weighed after the treatments were finished. A record of the runs is given in the divided Table 1.

Load.	Class.	Period of treatment. In Steam. Hours.	In vacuum. Hours.	In oil. Minutes.	Oil pressure Lbs.
1	Mixed partly seasoned.	4	5	45	22
2	Sap partly seasoned...	None.	2	31	25
3	Sap partly seasoned..	3	4	12	29
4	Mixed green	6	5	55	50
5	Heart partly seasoned.	3	4	160	80
6	Heart and sap partly seasoned	4	4	50	36

Load.	Class.	Absorption per cubic foot. Average. Pounds.	Maximum. Pounds.	Minimum. Pounds.
1	Mixed partly seasoned.	S. 17.63	S. 26.92	S. 7.14
		H. & S. 9.30	H. & S. 20.88	H. & S. 1.65
		H. 4.76	H. 10.99	H. 1.65
2	Sap partly seasoned..	15.02	25.82	7.14
3	Sap partly seasoned..	17.08	35.71	6.04
4	Mixed green	S. 9.98	S. 15.38	S. 6.59
		H. & S. 8.40	H. & S. 13.19	H. & S. 3.85
		H. 7.45	H. 12.64	H. 3.30
5	Heart partly seasoned.	10.30	23.08	2.75
6	Heart and sap partly seasoned	12.07	26.37	2.75

Table 1.—Record of the Preliminary Tests.

Load No. 1 was made up in accordance with specifications which may be taken fairly to represent ordinary commercial practice. No attempt was made to restrict the load to any one class of arms, but, on the contrary, all three classes were represented; and care was taken to make the load as nearly as possible representative of the usual conditions for treatment. The preliminary steaming of four hours was at about 20 lbs. pressure to the square inch. Twelve pounds of creosote to the cubic foot was required. In the same load the variation in the absorption of oil was in some cases from nearly 27 lbs. per cubic foot, the maximum for the sap class, to about 1½ lbs., the minimum for the heart class; a total difference of over 25 lbs. per cubic foot. The average absorption per cubic foot for the sap class exceeded the specified amount by about 5½ lbs., whereas that of the heart class was over 7 lbs. too light. Even the maximum amount absorbed by any one heart arm was 1 lb. less than the specifications called for. The sap class absorbed nearly twice as much oil as the mixed class and 3.7 times as much as the heart arms.

Load No. 2 was made up of partially seasoned arms. The customary steam bath was omitted, and the wood was warmed merely by passing superheated steam for 30 minutes through the coils in the bottom of the cylinder. The absorption of this load averaged more than 3 lbs. per cubic foot in addition to the amount required by the specifications.

Load No. 3 was made up of material similar to that in load No. 2. It was given a bath of live steam for three hours. The steam was then blown off and the temperature maintained for one hour by the superheated steam in the coils. A four-hour vacuum was drawn before the oil pressure was applied. The absorption of this load averaged over 5 lbs. per cubic foot more than the specifications require. It should be noted that the time required for this load (treated according to the regular specifications) was eight hours and twelve minutes, whereas load No. 2 required only two hours and thirty-one minutes.

Load No. 4 was composed of arms representing all three classes. The preliminary treatment consisted of six hours steam, one hour blow-off, and five hours vacuum. That the wood absorbed the oil comparatively slowly is shown by the fact that a pressure for 55 minutes at 50 lbs. was required to force the desired amount of oil into the wood. By reference to the table it will be noted that the variation in the amount of oil absorbed by the several grades in this load is comparatively slight. This may be due to the fact that live steam has a greater influence upon green heartwood than upon heartwood partially seasoned. On the other hand, sapwood becomes more receptive of oil when air seasoned than when subjected to the bath of live steam.

Load No. 5 was composed of partially seasoned heart arms. The wood absorbed the oil very slowly and showed the difficulty of forcing large quantities of oil into the dense heartwood. Twenty-four per cent of the total amount of oil absorbed during the entire treatment was taken up by the wood within 15 minutes after the oil was first turned in and before the pumps were started. It required nearly ten times as long to force the remaining 76 per cent of oil into the wood as it did for the wood to absorb without pressure the 24 per cent. The average absorption was 10.3 lbs. per cubic foot, as compared with 4.76 lbs. for the heart arms in load No. 1, in which the arms of the three classes were mixed indiscriminately.

Load No. 6 was made up of partially seasoned heart and sap arms (Class C). The average absorption was 12.07 lbs. per cubic foot. The variation between the minimum and maximum absorption per cubic foot was due to the fact that in some arms the percentage of heartwood largely exceeded that of the sapwood, and vice versa. It is, therefore, evident that the maximum amount was absorbed by an arm having a large percentage of porous sapwood, while the minimum amount was taken by an arm in which the heartwood predominated.

These preliminary tests, although necessarily incomplete, served to bring out strongly several important points: They clearly demonstrated that the present system of treating heart arms and sap arms together, without regard to the amount of moisture they contain, results in an excessive and detrimental absorption of oil by the sapwood and an insufficient penetration of the heartwood; that a lighter treatment than 12 lbs. of oil to the cubic foot is probably sufficient for sapwood; that an economy could be effected by regulating more carefully the preliminary steam and vacuum processes; and that allowing the material to become air dry before treatment is beneficial.

PLANS FOR THE FINAL TESTS.

After the undesirable results of the prevailing method had been demonstrated it was necessary to devise methods of handling and treating the material which would result in a more thorough, more uniform, and less expensive penetration. An extended experiment was begun in August, 1905, at the plant of the Norfolk Creosoting Company. Arrangements were made by which 1200 freshly cut cross arms were to be turned over to a representative of the Forest Service each month for a year. These arms were cut in Montgomery county, N. C., about 300 miles from Norfolk. On their arrival at the creosoting plant the arms were graded into three classes, similar to those which had been adopted in the preliminary treatments. The arms were weighed as soon as they were removed from the car, and piled in various forms to season. A portion of each class was soaked in water for 10, 20, and 30 day periods before piling. It was at first thought that the loss in weight en route from the sawmill to Norfolk might be so great as not to permit the weight at Norfolk to be considered as the green weight of the wood. To test this probable loss an agent of the Forest Service was sent to the mill to weigh the first month's cut, just as the arms came from the saw. The arms were then shipped in a closed car and reweighed in Norfolk immediately as they were removed from the car. As the average loss in weight was only a fraction of a pound, it was too slight to be taken into consideration. Arrangements were made with the sawyer in North Carolina to use only absolutely green material for subsequent shipments of experimental arms, and with the railroad companies to rush the cars through without delays.

SEASONING.

THE AIR-DRY AND OVEN-DRY WEIGHTS OF LOBLOLLY PINE.

Timber is ordinarily said to be air-dry when its moisture content is constant on more or less direct exposure to the open air. The term is merely relative. Wood exposed to the full force of a summer sun during several weeks of dry weather obviously will contain less moisture than the same wood under more humid conditions. In extreme cases this variation may be several pounds per cubic foot of timber, but ordinarily it is confined within comparatively narrow limits. Hence the term "air-dry" furnishes a convenient means for distinguishing the moisture content from that of green, kiln-dry, steamed, and oven-dry wood.

All of these terms are relative except the last or oven-dry weight. Hence this has been adopted as a basis for determining the amount of moisture present in loblolly pine of different weights. The oven-dry weight is obtained by extracting all possible moisture from the wood at a temperature of 100 deg. C. A small amount of water still remains even at this temperature, and can only be eliminated by the destruction of the wood itself. However, for all practical purposes, the oven-dry weight may also be considered the absolutely dry weight.

For the heart class of loblolly pine cross-arms this weight was found to be 28.8 lbs. per cubic foot. A cubic foot of the sap class weighed 27.8 lbs., and the intermediate class weighed 28.1 lbs. per cubic foot. For practical purposes these weights are similar enough to be considered identical; so the weight of the intermediate class, 28.1 lbs. per cubic foot, was applied to the other two classes. The practical application of the figures thus becomes much simpler because it is not necessary to take into consideration the proportionate amounts of heartwood and sapwood. The similarity of the oven-dry weights of heartwood and sapwood indicates that the greater weight of air-dry heartwood is due almost wholly to a greater moisture content, and not, as is popularly supposed, to the added weight of the resins, gums, and other substances which are deposited in the cells during the change of the wood from sapwood to heartwood.

Loblolly pine cross-arms present unusually favorable conditions for rapid seasoning. The wood is open-grained and porous; the percentage of sapwood is high; the cross-arms are of comparatively small dimensions (3¼ by 4¼ ins. by 10 ft.), and the percentage of exposed surface is relatively large. The pin and bolt holes bored at right angles to the fibers increase the exposed cross-section area and probably have an important influence on the rate of evaporation. Therefore the results that have been derived can not be applied without modification to timber of other dimensions even of the same species.

In Europe the regular practice is to permit the timber to become air-dry before treatment; but in America it is a common statement that when a large contract is given for treated timber the trees which will furnish the wood are still standing in the forests. Hence, even where the value of air seasoning is recognized, the questions of most pressing importance are, "How long must the timber be held before it is in a condition to treat, and how can this period be lessened?"

The length of time required for air seasoning depends upon the character of the timber, atmospheric conditions, and the manner in which it is piled. Each of these points will be considered in turn.

Table 2 gives the weight of the moisture and the moisture content in per cent of the dry weight of loblolly pine at different stages of seasoning. If the weight of a particular stick of timber and its volume are known its moisture content can be immediately determined.

Weight per cubic foot.	Weight per arm (0.91 cubic foot).	Amount of moisture per cubic foot.*	Moisture content in per cent of oven-dry weight.
Pounds.	Pounds.	Pounds.	Per cent.
60	54.6	31.9	113.5
59	53.7	30.9	110.0
58	52.8	29.9	106.4
57	51.9	28.9	102.8
56	51.0	27.9	99.3
55	50.1	26.9	95.7
54	49.1	25.9	92.2
53	48.2	24.9	88.6
52	47.3	23.9	85.1
51	46.4	22.9	81.5
50	45.5	21.9	77.9
49	44.6	20.9	74.4
48	43.7	19.9	70.8
47	42.8	18.9	67.3
46	41.9	17.9	63.7
45	41.0	16.9	60.2
44	40.0	15.9	56.6
43	39.1	14.9	53.0
42	38.2	13.9	49.5
41	37.3	12.9	45.9
40	36.4	11.9	42.3
39	35.5	10.9	38.8
38	34.6	9.9	35.2
37	33.7	8.9	31.7
36	32.8	7.9	28.1
35	31.9	6.9	24.6
34	30.9	5.9	21.0
33	30.0	4.9	17.4
32	29.1	3.9	13.9
31	28.2	2.9	10.3
30	27.3	1.9	6.8

Table 2.—Weight of Wood of Loblolly Pine at Different Stages of Seasoning.

(To be continued.)

External Relations of a Telephone Company.

By H. S. Grant.

Corporations have characters just the same as have individuals. A company may be honest in its dealings with others, it may be dishonest; it may be slow in paying its debts, it may be prompt; it may be timid, it may be aggressive; it may be stingy or it may be generous, and this not depend wholly on the character of its officers. It is the character of the corporation and cannot be changed materially without making a radical change in its employees from the top to the bottom. In other words, changing its personnel.

A company that is just to its employees has a great asset in their loyalty. They boost the company on every possible occasion. If someone says his company's service is poor, the loyal employee immediately bets him five dollars that it is better than he gets from the other company, or if one of his friends is thinking of putting in a telephone, he advances a multitude of reasons, some good, some bad, but all of them fervent, why the friend should put in his company's service. But suppose that instead of being treated well and advanced according to his merits, the manager of his company has just brought in his wife's brother from the country, who does not know a telephone instrument from a storage battery, and given him charge of the office, or the terminal room, or put him somewhere else where he is useless; does the old employee boost the company's service very strongly or bet five dollars that it is better than that of the other company? Not that anybody knows of; because he does not know at what moment the manager's wife's other brother will be brought in from the country to take *his* position away from him.

The writer knows of a company which gives most of its employees half a day off on Saturday all the year around; it gives them a two week's vacation with pay; it gives all the operators quite a valuable present every Christmas; it has nice working hours, but does not pay very high salaries. All of the employees work together. There is no jealousy or backbiting. Sometimes an employee leaves the company, tempted by a higher salary, but it usually happens that before the year is out he is back again looking for his old job. He prefers to work for lower wages and among friends than to be employed at higher wages and afraid of his job.

The company should be honest with its subscribers. It should not tell them one thing and then do another. If it tells a man it is going to disconnect his telephone because his account is in arrears, it should do it, otherwise, when the company tells the next subscriber to come in and pay up his account he will think it a joke.

For a company to be courteous to its subscribers, it is necessary that all its employees shall be courteous to the subscribers. This does not mean that the manager be courteous and all the other employees be curt, neither does it mean that the company should be so careful of its subscribers' feelings that it does not come to a full understanding with the subscriber at the beginning. It need not be so afraid of their feelings as not to tell them they are expected to pay their rental in advance and to keep paid in advance; that if they have a telephone moved they are to pay the company the actual cost of moving; that if they break any part of their instrument they must pay for it; that they must keep their telephone for a year or pay the company the cost of installing and removing it. They need not be told these things harshly in order that they may understand them, but should be told in a gentlemanly way, and if they think that certain of the requirements are arbitrary, it is proper to tell them why they are not arbitrary, but necessary. There are very few prospective subscribers who will balk at any reasonable requirements if the proper explanation is given them.

Outside of the telephone company's employees and subscribers, it occasionally meets the general public, the city and other corporations. As for the general public, the company meets them in various ways. Often it wants a private right of way, which it can usually buy if it approaches the owner in the right manner. Once in a while it runs across a person who wants the company to pay him the value of his whole property for the privilege of putting a pole on his property line at the extreme corner of the lot. Sometimes the pole he wants pay for is in the street in front of his house. The general public, ordinarily, is not very modest. Sometimes a wire crosses through a nervous owner's trees and he is afraid that the current will burn the top off of the tree, or the wire touches his house and he is afraid that he will be struck by lightning in consequence. A man will often come in and say that he wants to move his barn and one of the company's poles is in the way; will not the company move it just over his line on the next man's property? Instead of moving the barn, he may be going to build a driveway, cut a door in the barn, or put in curbing; but after the pole is moved in front of or behind the next man's lot, the barn is not moved nor the driveway built nor the barn door cut, or the curbing put in, nor did he intend to do any of these things. He wanted the pole moved.

The company meets the city when the company wants to

* The total weight per cubic foot less the oven-dry weight (28.1 pounds).

build a pole line, or when the city wants a pole line taken down. It meets the city when the city orders its wires to be put underground in a certain district, or when the electrical inspector orders it to take down a drop which crosses a street, and is hitched to two trees and three barns, which the company ran against its own wishes and at considerable expense, in order to shut up a man who had been pestering it to death for its service. Again it meets the city when the city comes around with its monthly request for a large number of free telephones.

When the street railway company wants to borrow a lot of fibre duct from the telephone company, it is a brother. When it is asked to pay for three or four cables eaten up by electrolysis, or to pay for repairing a 400 pair cable into which one of its workmen has stuck a pick, it is a forty-second cousin. Its relationship is elusive.

The telephone company that is timid is continually being browbeaten by those it comes in contact with. Its subscribers bluff it out of collecting its money. Corporations evade the terms of their contracts with it, or ignore them entirely. A company to be respected must be spunky. It will be money ahead by having a lawsuit once in awhile.

Leaks and Loose Ends in the Telephone Business*

By E. D. Glandon

The telephone business is very largely a business of detail. In fact there are few enterprises in which there are more opportunities for leaks than in the average Independent telephone system, consisting of a few exchanges, a few hundred farmers' stations, and some toll lines. In such a system, the manager is called upon to serve alternately in several capacities, and unless he is a pretty good all-around man, a thorough inspection will reveal leaks and loose ends the stopping of which would make the balance sheet tell a different story at the end of the fiscal year. It would in many instances make such a saving as to render profitable an otherwise unprofitable investment, or transform a low grade security into an extremely desirable or salable one. Apathy or interest, distrust or pride, and their attendant influences, are manifest among those holding our investments in direct proportion as we show our properties to be running at loose ends or we are at the helm and know what to do, how to do it, why to do it, and when to do it.

If, then, getting hold of detail may turn the balance from loss to profit or from good to first class securities, shall we not pause for a few moments and check up? Out of refuse pieces of glass, an almost matchless cathedral window was once said to have been constructed; out of the screenings of abandoned gold mines, fortunes are being amassed, and I might go on *ad infinitum*, but the suggestion is, I trust, sufficient.

This subject seems to give license to enter any phase of the business, but I shall not exercise such privilege except in pointing out where such savings may be made as have recently come under my observation.

In construction, since labor constitutes so great a proportion of the initial cost of property, the best materials and apparatus are always the cheapest, so that renewals may come as seldom as possible. Hasty purchases without proper investigation are frequently quite expensive. Money is frequently saved by a thorough investigation in the purchase of supplies not controlled by trusts. Often a man can secure as many different prices as he writes different letters. Quantity and cash discounts are frequently neglected by good firms when substantial sums could be saved by giving them attention. Batteries may be purchased in large quantities on yearly contracts by several companies ordering together, thereby effecting a substantial saving. In passing, it should be noted that in the purchase of batteries, no battery of ordinary cost is too good for telephone use, for the additional cost of a good battery bears a very small relation to the additional cost of sending a troubleman to look after a poor one.

While it may not be exactly in keeping with the subject of this paper to touch upon materials to be purchased, yet the writer cannot refrain from suggesting that although the cost of copper may seem high, there are important reasons why a manager should consider carefully the advisability of adding copper in future construction or reconstruction. Among these are that its junk value is practically equal to its cost, and that the interest on the additional investment just about equals the maintenance of the iron wire, which is good for only ten or fifteen years at the outside, to say nothing of the increased possibilities of copper service. The fact should not be lost sight of that good service brings much more business than service rendered over inferior lines. With the extension of our long distance connections, we should, as we replace our local circuits, do it with copper—I might add that my company is practicing what I am preaching, and somehow we have the notion that with such circuits, competition won't trouble us very much. It is hardly worth while to call attention to the inadvisability of erecting oak poles. It seems to me that there are very few cases where such construction is at all excusable, especially since poles of all kinds and especially for farm line construction can be bought so cheaply as this year. It costs as much to set oak as cedar. Cedar for farm lines costs only about fifty per cent more than oak, and lasts at least twice as long. As against oak, cedar will save in its life one-half of the construction labor and twenty-five to thirty-five per cent of its first cost. A point offering possibilities of much gain to companies would be, if possible, to purchase substantial quantities of cedar while the market is low.

Especial attention should be paid to labor expenditures, and the quality of service secured. Granting that the management is what it should be and that the manager is really earning the salary paid him, next in importance is the wire chief or the one serving in that capacity. Where the care of valuable property and the direction of expensive labor is placed under his control, such a man should be of the sober, calculating type, who realizes fully the importance of the service to be rendered, and the loss or gain incident to the proper handling of men. Much money may be lost to the company by his failure to keep close tab on the men working under him. In the smaller exchanges, especially, is it too frequently true that the one serving in the capacity of wire chief does not so plan the work of his troublemen as to get the most done with the least amount of travel. Careful planning in this direction will save much time for men and vehicles. The wire chief should be a sort of detective and have an abnormal development of the intuitive sense, so that he will be enabled

* Paper read at the Illinois convention.

to indicate to those under him the probable cause of difficult cases of trouble. The wire chief who can also serve as a sort of monitor over the apparatus which might otherwise go to the junk pile can save much to his company. A good file for trouble tickets is a valuable adjunct to the wire chief's department, determining where too much time is being spent by troublemen. This file can be used to advantage in the smallest exchanges, and certainly to great profit in the larger ones—it will enable the management to determine when it is cheaper to rebuild than to repair.

If a company has much repairing, it will be justified in considering the savings incident to a well-equipped shop—if it has not one already. Factory labor is high, time is lost in shipment, and much inconvenience is frequently incurred by the delay. A shop in connection with the wire chief's quarters frequently makes it possible for a small company to employ the services of a much more competent man than is possible where he is used only as wire chief, or where his time is divided between that of wire chief and installer or troubleman. A well-equipped repair department, under favorable conditions, pays well. The company which the writer represents has easily effected a saving of one-half the money formerly paid for factory repairing by the equipment of a shop. Competent men for such service can be secured at very reasonable salaries.

Underestimating the saving due to a reasonable amount of measuring and testing apparatus is an error made in some exchanges. A good voltmeter, or bridge set, will usually save many times its cost each year in locating grounds and crosses, especially in cable and on toll lines. A volt-ammeter is indispensable to the man who wants to have a full knowledge of batteries. For quick work in locating toll trouble, a liberal distribution of test stations, to be handled by operators along the line, will save much money which would otherwise be spent in making long and frequently unnecessary drives.

It will pay us to keep up with our trouble, repair or general construction work. When a man is behind, it is humiliating for him to meet his subscribers, lest they call him to account for an unperformed duty or a broken promise. It is easier and cheaper and much more inspiring of respect to lead and not be driven. I might add in passing, too, that frequently orders are cancelled where installation is delayed, and, on the other hand, more orders are received where it is generally known that the telephone will be installed as soon as a request is made.

Perhaps one of the most common leaks comes through failure to get pay for messages sent from farmers' stations. The farmer too frequently tries to include the non-subscribing neighborhood about him under his contract, and the company is the loser. Frequently he makes a call for one person and substitutes another when he thinks the operator is off the line. A tactful operator is about the only protection against this loss. Loss incident to failure of toll operators to try a second or third routing in case the first routing is busy or out of service very frequently would aggregate a large sum could it be reckoned at the end of the year. The franking privilege so common among the smaller companies should be watched carefully and checked up frequently. It is a bad custom and does not receive the sanction of the best business principles.

In the accounting department the writer would counsel moderation. Accounting overdone or underdone spells loss. There has come under my observation an operating company, operating some 4,500 stations and 500 miles of toll line with an investment of probably $300,000 and an annual income of approximately $70,000, whose accounting department is costing over $3,000 per annum. Perhaps such an expenditure is necessary for absolute accuracy, but it is my opinion that that company is paying for too much red tape. It is attending too closely to details. In fact, it is following detail too far. The game is scarcely worth the powder, and just where to stop is a matter for each company to settle for itself, for local conditions determine most largely the extent to which it is necessary to carry the accounting. On the other hand, too little accounting not only means loss, but leaves the stockholders in the dark as to what their investment really is earning. The combined accounting cost for the properties which I represent, approximately an investment of $175,000, is about $900 per year, and considerable more work could be done at practically the same expense. The gross income from these properties is approximately $40,000 per year. This means, then, that the cost of accounting does not exceed 3 per cent of income, including stationery and books. And I feel that our stockholders have adequate means of knowing to a reasonable degree of certainty what their property is doing.

There is another opportunity for loss or gain in our intangible asset, public confidence, respect and good will. The telephone business is not so enormously profitable as to render the taking of the public into our confidence, a dangerous thing to do. The people, as a rule, think our profits greater than they really are, and if such is the case, we are gainers by confiding in them. The business is of a quasi-public nature, and to deny the public general information as to the condition of the business and some voice in its regulation, will not only weaken our hold upon it, but tend to bring upon us such odium as that heaped upon the Bell company and its subsidiaries in past years, and make us vulnerable to competition.

The acquisition and conservation of this extremely valuable and necessary asset, then, must not be overlooked. Once acquired, it assures a restful pillow and delays the coming of gray hairs. Its cultivation is largely a matter of showing an interest in the needs of the public and making an honest effort to supply them. The personnel of the representative heads of our companies weighs much in the public eye, but such influence, to be of full value as an anchorage to our investments, must have the accompaniment of good faith and effort on our part. That representative of any concern who assumes to rise above those with whom he does business, or, on the other hand, fails to command the respect of, or for any cause gets out of touch with his patrons, should be relegated to the background and his position filled by one better fitted. Unfailing kindness and solicitude shown by our operating force can scarcely be reckoned in dollars and cents. They represent us and reflect the real inwardness of our business—they should be impressed with the necessity of guarding every act. Place your operating standard high, and do not be niggardly about paying a good price and showing your appreciation for good service.

Telephone Dispatching on the Rock Island Railroad.

It is announced that the branch of the Rock Island Railroad running from Herington to Salina, Kan., is to be operated by telephone instead of by telepgaph.

It was first the intention to have both systems in operation, so that in case of one being out of repair the other could be used. Later it was decided by the officials that on the branch roads the telephone is sufficient, and accordingly the telegraph instruments were removed.

The telephone system, which was installed about a month ago, is working to perfection, according to the local authorities. No trouble has yet been experienced and as a whole it has proven much more convenient than the former telegraph system. Each station is now in close touch with the others, where before only a few had operators. The smallest station has the same advantages as Salina, which is the largest.

Postmaster-General Runs His Office by Telephone.

Postmaster-General Meyer is "running" his department this summer by long distance telephone from his home in Hamilton, Mass. Although he has been absent on his vacation for about a month, he has kept in daily personal touch with Dr. Holmes, his private secretary, and other officials.

Telephone Law

Conducted by A. H. McMillan

Protection Against High Tension Lines.

The following inquiry comes from Hawaii:

I wrote you some time ago for information regarding high tension lines. The line has been completed for some time, and carries 33,000 volts and somewhere between 2,000 and 3,000 amperes.

This power is used by the sugar plantation for pumping water and other purposes. When this company asked for the privilege of crossing the government road some ten times; it was granted, and no questions asked. I tried at that time to have ourselves and the public protected by having the power company put a cradle under their wires, where they crossed the government road, but did not succeed. We have a very damp climate, and it was not long before the power line began to give trouble, pins burning off, and poles burning off where the iron crossarm braces were bolted to the pole. Of course the trouble is getting worse as the line grows older, and in a short time conditions will be absolutely dangerous to life.

This line runs on private property, with the exceptions of the places where it crosses the government road, and the telephone wire is so low that you can touch it with the hand from the back of a horse. At this time the power company is using iron pins, which I think is wrong. They should put on a better insulator. I would like to say that it is not an occasional pin that burns off, but the pins are burning off right along. I have seen at least twenty-five pins burnt at one time, and that in the short distance I can follow the line from the government road with the eye. The power company uses iron crossarm braces and fastens its guy wires close to the arm braces, and then direct to iron guy rods. I have seen several poles burnt off at this point. I forgot to state that these wires run direct to earth (a beautiful ground).

I wish to ask you to give me all the information you possibly can regarding high tension lines, the stand the law takes in preserving the lives of people, and the preservation of other companies' poles and wires, in the different states in the Union.

The whole situation can be summed up thus: The law of every state in the Union is that a company must answer in judgments to be collected in a civil suit for any injury to life or property occasioned by the negligent stringing of its lines across a highway. The company must erect its lines high enough over the roadway to avoid interfering with passing teams and vehicles, and with such precautions, such as guard wires and cradles, as are reasonably needed to protect adjacent wires from interference. If there is danger of injury to the property of a telephone company, such company may secure an injunction to restrain the trespassing company from continuing to keep its lines in a dangerous condition. All this is according to the principles of the common law, and you do not need an act of the legislature to protect you, although it would be helpful to have one. In some states there are statutes providing that all electric, telephone and telegraph wires must cross the highways at a certain distance above the ground. This distance varies from fifteen to twenty-five feet, the latter figure being the one now considered to be most advisable.

Gross Earnings Tax Is In Lieu of All Other Taxes.

The Supreme Court of Minnesota has handed down a very important decision in construing the tax laws of the state applicable to telephone companies. In deciding the suit brought by the state against the Tri-State Telephone & Telegraph Company, the court holds that the gross earnings tax is in lieu of all other taxes except special assessments, thus sustaining the ruling of the Ramsey County District Court. The history of the case is as follows:

In 1896, a constitutional amendment was adopted, authorizing, among other things, the collection of a gross earnings tax from telephone companies in lieu of all other taxes. In 1897 the legislature passed a law fixing a gross earnings tax of three per cent upon the earnings of telephone companies in lieu of all other taxes and assessments.

In 1899, the Supreme Court upheld this law and interpreted it as exempting all property, both real and personal, from ordinary methods of taxation; and that decision exempted the company from the payment of special assessments.

In a later case, also brought by the state, against the Northwestern Telephone Exchange Company, a suggestion made by the court indicated that it might still be an open question in this state whether the gross earnings tax exempted real property from ordinary methods of taxation. Thereupon the Ramsey county officials listed the real estate of the Tri-State company for general taxation; and in resisting the payment of this tax the case was finally taken by the company to the Supreme Court.

In its decision the Supreme Court holds that the constitutional amendment of 1896 (Chapter 7, G. L., 1896) was an extension to the corporations therein named, without change or modification, of the gross earnings system of taxation previously enforced as to railroad corporations. Chapter 814, G. L., 1907, imposing the gross earnings tax upon telephone companies in the state was found valid under the constitutional amendment above mentioned.

To be reported in the Northwestern Reporter.

Company Held Liable for Loss of Business Resulting from Interrupted Service.

A telephone company is liable for loss of business to a subscriber resulting from interruption of communication over the line through carelessness of employees.

This is the substance of a ruling made by Justice Stocker at Cleveland, Ohio, in the case of Dr. Mariette E. Hughes against the Pacific Telephone & Telegraph Company. The plaintiff is a practicing physician. She had expected to be called at any minute to attend a special case in the north part of the city on the night of Jan. 24. Her son, who is also a practicing physician, using the same office, remained at the office all night for the sole purpose of receiving the call, but no call whatever was received.

It was later discovered that the telephone company in repairing telephones about the building had disconnected the plaintiff's telephone, thinking the wire on which the men were working was "dead." The plaintiff failing to receive the call to attend the case, for which she would have received a fee of $35, sued the company for that sum, and judgment for that amount was allowed by the court.

The defendant, for a defense, set up the clause in the contract between a subscriber and the company to the effect that in case communication is interrupted from any cause whatever, the only liability of the company shall be to abate the rent during such interruption after 24 hours' notice thereof to the company, and that no written notice of any interruption was ever given by the plaintiff to the defendant.

Suit to Determine Franchise.

The city of Owensboro, La., is instituting suit against the Cumberland Telephone & Telegraph Company. This suit is for the purpose of ascertaining whether the Cumberland company is operating under a franchise in Owensboro. City Attorney Slack claims that the company is without a franchise.

Telephone Finances

Independent Telephone Bonds in Pennsylvania.

The Telephone Securities Company, of Harrisburg, Pa., which deals in the securities of the American Union Telephone Company, has issued a circular setting forth the advantages of the company's bonds as a safe and profitable investment in the following terms:

1st. These bonds pay 5 per cent interest year in and year out until maturity, at which time the holder will get the face value of the bond in gold coin.

2nd. They enjoy a long term which makes them a desirable investment. They pay 5 per cent during good times or bad times and during years when it is difficult to obtain over 3 or 4 per cent on money.

3rd. They are especially attractive for the reason that investors may carry them as a permanent investment; or, on account of their salability, they can dispose of them at any time they wish to convert them into cash.

4th. Bonds in general offer a safe, convenient method for the investment of money and a good 5 per cent bond, properly secured, is the basis for an ideal investment. Bond buyers may purchase safety at 5 per cent, while they might purchase a risk at 6 per cent.

5th. Bonds are no longer the cherished investments of only the very rich. They are now issued in denominations of $100 and $500 as well as $1,000. The smaller denominations are readily obtainable by people of moderate means who do not have $1,000 to place at any one time but who are desirous of investing their smaller amounts in securities which are perfectly safe and yet will pay a larger income than they will get from the savings bank.

6th. The telephone is a fixed and established institution. Thirty years ago it was considered little better than a toy. Fifteen years ago it was a luxury, while today it is recognized as an economic factor in the world's commercial and social life which is absolutely indispensable. There is nothing to take its place. The public must use telephone service and there will never be but two great telephone systems in the United States, the Independent and the Bell. No municipality will give a franchise to a third competing company.

7th. A large telephone system if properly located and managed must, of necessity, be a money making business. A company does not sign an agreement to sell service unless it knows beforehand that it will make a profit out of the contract. Every accepted contract means a profit to the company that is as certain as collections—and collections are certain or the service is discontinued. There can be no uncollectable accounts of any consequence. Payments to the company are made in small amounts, at frequent intervals, from a large number of people, and in advance.

8th. The earning power back of the American Union bonds is from 65,000 subscribers who annually pay into the company's treasury an average of about $23.50 each, for local and long distance service. The telephone is being used more and more each year, and as additional and improved facilities are being provided for long distance service, it is safe to figure that the average return from each 'phone will constantly grow. But even if this average remained at $23.50 the earnings of the system are almost three and one-half times the interest on all outstanding bonds, and are sufficient to yield a surplus after paying all expenses (including maintenance and fixed charges) equal to over 50 per cent of the interest payments.

9th. The security behind these bonds is exceptionally good. The general mortgage of the American Union Telephone Company is a lien upon all its telephone lines and system, rights of way, property, income, corporate rights and municipal grants, rights and franchises, and upon all the capital stock and bonds of other telephone companies owned by it, which it now owns or controls, or may hereafter acquire. This security cost nearly double the entire amount of outstanding bonds, and is constantly being enhanced by extensions and improvements made from the reinvestment of surplus earnings. And in addition to the physical property which is pledged as security for these bonds are the names of 65,000 subscribers on the books. These names represent 65,000 signed contracts for telephone service to be paid for in advance. This is a very valuable asset and is a secondary security.

10th. The bonds of the American Union Telephone Company fulfill the requirements of an ideal investment. The principal is secure, the earnings are assured and the rate of interest is unchangeable. Coupons are paid semi-annually, February 1st and August 1st of each year. They are a safe investment. These bonds are well and favorably known and are advertised continuously and extensively. There is always a ready market should the holder at any time wish to dispose of them. This is a feature which a large number of bond issues do not enjoy. Many bonds represent a mortgage on a plant or property which is unknown outside of a limited territory and their sale is practically confined to that small radius. The American Union bonds are now marketable in seven states and the demand for them is being daily extended. They are issued in denominations of $100, $500 and $1,000, making them within the reach of thousands of people who have always considered themselves as being unable to own bonds. They may be purchased for cash or on installments.

The following companies are now embraced in the system of the American Union Telephone Company:

United Telephone & Telegraph Company, embracing Altoona-Phoenix Telephone Company; Central Commercial Telephone Company; Chester County Telephone & Telegraph Company; Delaware County Telephone & Telegraph Company; Home Telephone Company, of Lewisburg; Independent Telephone Company, of Lancaster; Keystone Telephone & Telegraph Company, of Norristown; Montour & Columbia Telephone Company; People's Telephone & Telegraph Company; Schuylkill Telephone Company; Shamokin Valley Telephone Company; and North & West Branch Telephone Company.

Cumberland Valley Telephone company, embracing Adams County Telephone Company; Cumberland Valley Telephone & Telegraph Company, of Chambersburg; Dauphin County Telephone Company; Hanover Telephone Company; Juniata & Susquehanna Telephone Company; and the Southern Pennsylvania Telephone Company.

Lykens Telegraph & Telephone Company.

Cumberland Valley Telephone Company of Baltimore City, embracing Boyd & Damascus Telephone Company; Maryland Telephone Company; Western Maryland Telephone Company; and Winchester Telephone Company.

Bedford County Telephone Company.

Maryland, Pennsylvania & West Virginia Telephone & Telegraph Company (also known as the Tri-State).

Huntington & Clearfield Telephone Company, embracing Cambria County Telephone & Telegraph Company; and the Indiana Telephone Company.

York State Telephone Company, embracing the Bradford County Telephone Company; the Elmira Telephone Company; and the Binghamton Telephone Company.

Port Allegheny Telephone Company.

Commercial Union Telephone Company, embracing Elk County Telephone & Telegraph Company.

Union Telephone Company of Erie succeeded the Union Telephone & Telegraph Company, embracing the Warren Telephone & Telegraph Company; Mercer Telephone & Telegraph Company; and New Castle Telephone Company.

Philadelphia, Pittsburg & Erie Telephone Company.

Consolidated Telephone Companies of Pennsylvania, embracing Lackawanna Telephone Company; People's Telephone Company; Lehigh Telephone Company; Consolidated Telephone Company; Slate Belt Telephone Company; Danielsville Telephone Company; Overland Telephone Company; Carbon County Telephone Company; Inter-State Telephone & Telegraph Company; Easton Telephone Company; Easton & Bethlehem Telephone Company; Honesdale Telephone Company; and the Berwick Telephone Company.

The American Union Company now operates 234 exchanges, with over 65,000 telephones, and connects with 10,000 more subscribers of affiliated rural lines. Its property lies in what is probably the richest industrial field in the country, covering the State of Pennsylvania, and extending into New York, New Jersey, Maryland, Virginia, West Virginia, and Ohio. It operates exchanges in a majority of the cities of Pennsylvania having a population of 10,000 and over, among which are Allentown, Bethlehem, Carbondale, Carlisle, Chester, Connellsville, Danville, Easton, Erie, Harrisburg, Hazleton, Lancaster, Lebanon, Reading, Scranton, Shamokin, Steelton, Wilkesbarre, etc.

Until recently the income of the several constituent companies was derived principally from local business. Since being merged into one unit, with improved facilities for inter-communication,

there has been an increase in revenue from local business and a very substantial increase in the income from toll or long distance service; and as soon as all the contemplated long distance equipment is installed the revenue of the system will be still further increased.

The American Union's last quarterly report (ending June 30, 1907) shows gross receipts of $256,619.42 and gross operating and maintenance expenses for this period were only $132,145.41, leaving a very substantial balance.

Following is a comparative statement of surplus earnings for eighteen months. The surplus earnings shown in the tables below represent the actual surplus from the gross earnings after paying all expenses for operating, maintenance, taxes, insurance and interest on the funded debt (interest on bonds and guaranteed stock).

6 MONTHS, JAN. 1st TO JUNE 30, 1907.

Income	$454,754.67
Expenses	408,362.60
Surplus	$ 46,392.07

6 MONTHS, JULY 1st TO DEC. 31, 1907.

Income	$503,631.11
Expenses	430,948.04
Surplus	$ 72,683.07

6 MONTHS, JAN. 1st TO JUNE 30th, 1908.

Income	$510,201.07
Expenses	432,088.15
Surplus	$ 78,112.92

Kinloch Long Distance Half-Yearly Report.

The strength of the Independent telephone industry which has enabled nearly all its companies to advance steadily and rapidly during the recent months of financial stress receives a new testimonial in the report of the Kinloch Long Distance Telephone Company, of St. Louis, for the first six months of 1908. This showing of returns is not made at the expense of the plant, as is shown by the ample monthly expenditures for maintenance, and the substantial reserve set aside for depreciation. Following is the company's statement:

Month	Revenue	Operating Expenses	Maintenance
January	$ 99,212.92	$ 27,155.99	$ 15,073.97
February	99,555.94	27,845.78	14,476.01
March	100,583.27	27,617.88	14,590.41
April	98,877.24	27,738.31	15,755.03
May	100,729.83	28,481.35	16,545.02
June	104,784.54	28,899.28	16,642.38
	$603,743.74	$167,738.59	$ 93,081.92

Month	Miscellaneous Interest	Taxes	Interest on Bonds	Net Profit
January	$1,691.91	$ 5,100.00	$ 20,183.33	$ 30,008.62
February	1,462.33	5,100.00	20,225.00	30,446.82
March	1,684.34	5,100.00	20,204.17	31,386.47
April	1,423.33	5,150.00	20,204.17	28,606.40
May	1,069.85	5,200.00	20,242.37	29,191.24
June	487.76	5,411.64	21,187.08	32,156.40
	$7,819.52	$31,061.64	$122,246.12	$181,795.65
Less reserve for depreciation, six months at $5,000				30,000.00
Surplus				$151,795.95

The net profit of $181,795.65 for the six months is an increase of $58,674 over the figures for the first six months of 1907, which were $123,121. The continuity of the growth of the company is evidenced, in turn, by the advance made in 1907 as compared with 1906, the net profits for the entire year in 1907 being $282,425.41, as against $182,267.74 for 1906, a gain of $89,857.

Following is the trial balance of the company for the year ending June 30, 1908:

RESOURCES.

Plant account		$7,488,373.65
Bonds in the treasury:		
This company's 5%	$376,000.00	
The Sub. Tel. Co.'s 5	156,180.00	532,180.00
Cash on hand		73,539.36
Accounts receivable:		
Rentals	$ 18,600.33	
Tolls	34,196.49	
Miscellaneous	10,572.36	63,369.18
Material		91,102.66
Kinloch Building Co.		40,255.14
Bills receivable		8,715.55
New construction		25,347.62
Furniture and fixtures, tools, horses and wagons		10,810.82
Advance operating expenses		11,914.10
All other resources		40,886.65
		$8,386,494.73

LIABILITIES.

Capital stock (issued)		$2,800,000.00
First mortgage bonds:		
6%	$2,000,000.00	
5%	2,881,000.00	4,881,000.00
Unearned rentals		5,985.57
Bills payable		125,000.00
Accounts payable		46,390.19
Accrued interest		117,762.65
Accrued taxes		33,198.02
Reserve for dividends		70,000.00
Reserve for depreciation		91,813.74
Surplus or undivided profits		215,344.56
		$8,386,494.73

Note.—Of the above $34,196.49 tolls uncollected, $28,049.69 is for last quarter, not billed or payable until July, 1908.

QUERIES.

Preventing Damage to Pole Changer Contacts.

In operating a pole changer in our exchange, it is found that the platinum contacts of the vibrator, both at the pole changer contacts and at the vibrator contacts, give considerable trouble through one side appearing to become larger than normal and the other side pitted. Filing the contacts does not prevent the condition from appearing again. Is there any way in which this effect can be overcome? Kindly advise us whether anything can be done to eliminate the difficulty.

Since the introduction of the harmonic converters used in four-party selective work, more information has been obtained as to the behavior of pole changers in general than had been hitherto available.

It is found that reversing the battery supply to the machine prevents the unequal pitting and building up of the contacts. It is recommended, therefore, that you insert a reversing switch in connection with your battery leads to the pole changer, and that this switch be operated to reverse the battery at least once every two or three days. After you have installed the switch, and carefully cleaned the contacts, you will undoubtedly obtain beneficial results from carrying out this plan.

Use of Transformer to Boost Voltage for Ringing.

Why, when ringing over a telephone line, could not one satisfactorily use an induction coil, connecting the primary side of the induction coil to a Warner pole changer and the secondary to the ringing strips of the switchboard, and use a much lower number of cells for the pole changer than is now required?

An ordinary telephone induction coil is not a suitable transformer for the service you wish to render.

Pole changers have been made in which two or three cells are used for operating the vibrating portion, and transformers are used for stepping the voltage up to give the required character of ringing current.

In fact, most of the harmonic converters used in selective signaling service are constructed along these lines. You will find the transformers are quite formidable when compared with a telephone induction coil. In other words, they are suitably constructed for delivering the required current, as well as voltage, which telephone induction coils will not do.

Changing Magneto Telephones to Work on Common Battery.

I wish to remodel some of my magneto (local battery) telephones to common battery. Please tell what will be necessary to do in order to make this change?

As a general proposition, it is scarcely ever found advisable to change a local battery telephone to common battery, unless

the transmitter and receiver of the local battery instrument are in first-class condition, and the transmitter can be remodeled to operate upon the common battery basis without requiring expensive changes.

In considering changing a local battery telephone to common battery, it must always be borne in mind that the circuits in the telephone must be completely changed. The induction coil must be replaced, and quite frequently the signaling bell also. At any rate, you may have to rewind it.

It is suggested that the best plan for you to follow is to take up the question of changing your local battery telephones with one of the Independent telephone manufacturers. If you will do this you will undoubtedly receive a complete estimate as to the probable cost of making the changes.

Selenium Cell for "Light Telephony."

There are some clocks in existence with holes in the pendulum, through which a ray of light passes into a special cell containing selenium, which closes and opens a circuit by action of the ray of light. Where can I get this special material. I saw it mentioned in Telephony in connection with an article on wireless telephony. If there is any way to make it, please let me know.

Selenium is a substance which requires very careful preparation in order to use it in connection with electrical apparatus.

Briefly, the selenium cell is prepared by placing two pieces of metal, usually in the form of wire, quite close together without actually touching, and filling the space between the wires with specially prepared selenium. Such a cell after having been prepared in a proper manner, offers varying resistances to an electrical current flowing through it in response to variations in the intensity of the light to which it is exposed. You can obtain the selenium from any supply house furnishing chemicals, but selenium cells all ready for use may now be obtained from certain foreign manufacturers.

Special Signaling Arrangements on Farmers' Lines.

In the operation of farmers' line telephones, is there any standard practice in operation of the bridging instruments, as respects the signaling of the central office and the telephones? I mean in regard to using direct current generators, condensers in the telephone circuit, and special signaling drops at the switchboard.

We know of no standard method, but general practice appears to indicate that the present preferred method is to equip farmers' line telephones with ringers of standard resistances between 1,000 and 2,500 ohms, according to conditions to be met. Generators are manufactured of the combined alternating and direct current type, and so arranged that the switchboard may be signaled whenever a push button, forming a part of the telephone, is pressed.

Normally, the telephone is so connected that driving the magneto generator simply signals the different bells connected to the line, and, as a rule, to the exclusion of the switchboard.

In the last stated plan, where the switchboard signal is not operated while the subscriber is projecting an alternating current over the line, it is to be understood that special arrangements must be applied at the switchboard to prevent the signal from responding to the alternating current, so that it will be operated only by the direct current.

Another plan which finds considerable favor is that of signaling the switchboard over one side of the line to ground, the switchboard drop being also connected to ground. In this plan the subscriber's telephone need not be equipped with a combination A C and D C generator. It is only necessary to install an A C generator and connect it to the push button in such a way that in signaling the central office the generator is connected to ground and not across the metallic circuit, as it is normally connected.

Under both of the plans mentioned it is usually the practice to install a condenser in each telephone receiver circuit, this condenser having a low capacity. Such a condenser will not allow any large amount of current to pass through a receiver accidentally left off the hook, therefore the signaling current is available for ringing the bells.

LETTERS ON PRACTICAL SUBJECTS

A New Party-Line Code.

The Oswego County Independent Telephone Company of Fulton, N. Y., has used the accompanying code in connection with its rural party line magneto telephones. The lines are full metallic and arranged to call central by a push button. The rural lines terminate in the toll section of the switchboard, and are numbered upward from 1 to 99. In the directory all numbers for rural line subscribers have four digits; the first two furnish the ringing code, and the last two the drop number. On all multiple or bridging lines no number is less than 5000. This is because we have reserved numbers up to 4999 for the regular four-party city subscribers. If a call is made for number 5000, or over, the operator knows at once it is for a rural subscriber and passes it to the rural position. The operator at the rural position must memorize five figures, from which all the combinations are made. We use the following:

5 one short and one long ring. 6 one short ring.
7 two short rings. 8 one long ring.
9 two long rings.

Thus we can make twenty combinations without the use of letters, and with a minimum of memorizing. We, however, never place more than 12 subscribers on a line.

Supposing the drop number was 22, the following would be the rings and directory numbers:

6622—two short rings.....on line 22
6722—three short rings..... " " 22
6822—one short, one long ring..... " " 22
6922—one short, two long rings..... " " 22
6522—two short, one long rings..... " " 22
7522—three short, one long rings..... " " 22
7922—two short, two long rings..... " " 22
8522—one long, one short, one long rings..... " " 22
8622—one long, one short rings..... " " 22
8722—one long, two short rings..... " " 22
8822—two long rings..... " " 22
8922—three long rings..... " " 22
9522—two long, one short, one long rings..... " " 22
9622—two long, one short rings..... " " 22
9722—two long, two short rings..... " " 22
9922—four long rings..... " " 22
5522—one short, one long, one short, one long rings..... " " 22
5622—one short, one long, one short rings..... " " 22
5722—one short, one long, two short rings..... " " 22
5822—one short, two long rings..... " " 22
5922—one short, three long rings..... " " 22

These are all easy rings, and there are enough of them to cover the most heavily loaded lines. In the case of a rural system which does not use the harmonic selective system, but uses only bridging lines, the numbers 1, 2, 3, 4, 5, can be substituted for the 5, 6, 7, 8, 9, which we use; this might be preferable.

As stated before, numbers up to 4999 are reserved for the regular four-party lines. All lines numbered 5000 to 5999 are reserved for our eighty-party harmonic lines. In practice we find the eight-party lines very successful for a better class of farm subscribers within, say, three or four miles of the exchange; beyond that we use the regular bridging lines, with push button to call central. As in the former case, with the bridging lines the first two digits represent the code and the last two the drop number; the 5 merely denotes that the line is an eight-party line; the second digits are 1, 2, 3, 4, 5, 6, 7, 8, as the case may be. Thus 5140 is an eight-party line, the drop number being 40, and the party is the first, requiring the pushing of the first button. The second button is used for the second party and so on up to the 5th party, which requires the reversing of the master key. The 5th party is the first party in the second series of four, therefore the first button is pushed; the 6th party takes the second button; and so on to the eighth which takes the fourth button. This will be readily comprehended by the operator.

On the local, or regular exchange sections, we use only four-party lines, two-party lines and single lines. Any number up to three digits is a single line. A number of four digits denotes a party line, the first digit denoting the party on the line, thus:

1411 is the first party on line 411.
2411 is the second party on line 411
3411 is the third party on line 411.
4411 is the fourth party on line 411.
410 is a single line.
88 is a single line.

The codes above described work well in practice. Operators have no difficulty in understanding instantly what party is wanted. If a call comes for a number above 4999 it is passed to the rural section. The rural operator knows at once whether it is an eight-party line or a bridging line by the first digit.

This system works perfectly in exchanges where the jacks do not number above 999. If the system is larger, it must be worked on a five digit system.

The code for the bridging and eight-party lines described above was devised by the writer after trying many other systems and codes, most of which require the use of letters, which are very unsatisfactory, or the memorizing of a large number of figures. The above system requires the use of only four digits and the memorizing of only five figures for all the combinations. It makes a clean-cut directory, doing away with letters or any other additions. There can be no mistake giving the correct number, and the service is greatly improved by the use of the system described.

M. S. Powell,
General Manager Oswego County Independent Telephone Company.

Test for Exact Location of Pin-Hole in Cable.

About a month ago the writer used a rather novel method to locate a case of trouble which had developed in a cable. The trouble appeared in a 50-pair cable about 2 p. m. on a very hot day, and immediately following a sudden thunderstorm. About 10 pairs were found to be out of service at the time the tests were made.

A Varley loop test was first made with the wire chief's bridge. Measurements gave the approximate location as about 30 ft. from a certain cable box. The cable was then carefully examined at this point, and for about 50 ft. on each side, but no defects in the sheath were found. Now, the "Y" sleeve at the cable box being a split sleeve, and rather roughly wiped and soldered, it was the general opinion that the trouble was at this point. However, before testing this sleeve to see if it contained moisture, the writer took an ordinary receiver, and connected it across one of the pairs in trouble at the cable box. Then, with a pair of pliers, the cable was struck at regular intervals around and near the "Y" sleeve. Not securing any results here, the cable was then tapped by an assistant at a point 30 or 40 ft. from the box, near where the Varley test showed the trouble to be. These taps could be plainly heard in the receiver for a distance of three or four feet along the cable at the above mentioned point. The cable sheath at this point was then re-examined, and by twisting the cable so that the bottom portion was exposed, a small pin-hole in the sheath was discovered. When the cable sheath was removed it was seen that the moisture had extended for a distance of two or three feet on each side of the hole. The cable was then repaired in the usual manner.

The explanation by which the writer accounts for the success of this method is that the tapping over wet cable conductors caused a variation in the leakage across the pairs, shunting more or less current through the receiver. The battery, of course, was that fed from the central office, standing on the pairs, the exchange being common battery. Of course, the "frying" and "sissing" on the cable piers, due to the normal leakage at the point of trouble, was audible in the receiver while making the tests, but as the regular beats were so different from any other sounds they could be readily picked up.

Used as an adjunct to the bridge test, the writer sees no reason why this method should not be useful. By cutting a few cells of battery in series with the receiver and pair, this could apply to cables at magneto exchanges, as well as those of the common battery type.

Hannibal, Mo. John B. Doolittle.

Telephone News

Harmful Sale of Independent Company at Nevada, Iowa, Blocked by Manager.

Telephone men of Iowa are freely expressing their admiration of the astuteness of F. M. Boardman, who, as manager of the Nevada Mutual Telephone Company, has been well known as one of the most successful telephone men and loyal Independents in the state, and has just blocked a deal which would undoubtedly have put the company in the hands of its competitor. U. S. Alderman, also well known in Iowa telephone circles, and until recently president of the Nevada company, is a man of a different stamp. During a recent temporary absence from the city of Mr. Boardman, who had gone on an automobile trip of several days along the company's toll lines, Alderman called on several of the larger stockholders who together held a majority of the stock and asked them to deliver to him an option on their stock.

Mr. Alderman told this story, said one of the men of whom he secured an option. "He said that our company was undoubtedly up against it, for the Bell people had put $250,000 into a fund in Des Moines to crush the smaller Independent companies in this section of the state. He said the Nevada company had been singled out as the first object of attack and that it would surely go under unless it joined with four or five other mutual concerns around Nevada for a joint defense. For the purpose of making a united fight Mr. Alderman said that a new company was being organized to consolidate these separate companies, with Homer Miller of Des Moines, president of the Iowa National Bank, as one of the promoters. He said that the only thing for the Nevada company stockholders to do was to turn over their stock to this new company or they would lose everything. He said the new company would pay us 65 per cent of the face of the stock and he asked me to give him an option on my shares, running to J. A. Mills of Nevada, a banker."

Nearly all of the men approached by Alderman accepted his story and gave him an option, although they could not understand why the stock should not be worth more than 65 per cent of par when it had never failed to pay a 5 per cent semi-annual dividend and had in addition accumulated a 60 per cent surplus. At the end of his day's work Mr. Alderman had secured options on a majority of the Nevada company's stock.

And then the unexpected happened—Manager F. M. Boardman came back. Something or other went wrong with his automobile, providentially, and he decided to return to Nevada instead of going on with his trip. Almost as soon as he reached town he heard of the deal, and suspected an attempt to deliver the company to its competitor. At once he got in touch with

other prominent Independent men. R. A. Walker, of Des Moines, saw Homer Miller, and found that he knew absolutely nothing of the proposed deal. At a special meeting of the Nevada stockholders, called on the night of Mr. Boardman's return, a Saturday, Alderman was confronted with the evidence of the falsehood of his story. When asked for an explanation, his answer was "I have nothing at all to say."

P. C. Holdoegel, J. H. Shoemaker, E. H. Martin and others prominent in the Iowa Independent Telephone Association arrived on the scene Sunday, the next day. When the situation was made clear to them the stockholders agreed to revoke their options, if possible. They drew up their revocations in due legal form and called out the sheriff to serve them as soon as the stroke of midnight brought in the next business day, Monday. The sheriff aroused Alderman from his sleep and read the notices to him. To make things doubly secure, attorneys were engaged that day to prepare an injunction suit, and an order was secured restraining the men who held the options from exercising them.

Subsequently Frank Bills, of Chicago, appeared in Nevada, and claimed to be the man behind the deal. A man in touch with the situation says: "We had absolute proof that Alderman had been in conference with the Bell interests in the meantime, and feel reasonably sure that Bills was only found at the last minute, and requested to try to carry through a deal that was a failure in its original form."

Alderman has been removed from the office of president of the company, and M. C. Allen elected in his place.

People's Company, at Butler, Pa., Will Enlarge Plant.

At the annual meeting of the stockholders of the People's Telephone Company, of Butler, Pa., held last week, the new board of directors was given instructions to increase the capital stock of the company by such an amount as they deem to be necessary, the proceeds of the stock sale to be devoted to the extension of the company's lines.

The report of General Superintendent J. E. Forsythe showed that the company has made rapid progress during the past year. Extensions of the lines have been built to Mars, Evans City and Zelienople. At present the company has under way the extension of its system to Chicora, where it is expected a large number of residents of the town will become patrons.

Many new telephones have been added to those in use in Butler, as well as in other towns covered by the company during the year.

The election of the board of directors resulted in the choice of J. V. Ritts, A. L. Reiber, T. M. Baker, J. H. Troutman and T. J. Shufflin, all of whom have been on the board for some years.

Results of Discontinuing Independent Telephone by American Express Company.

The manager of an Independent telephone company in a small city tells of the conditions following the order of the American Express Company to discontinue the use of the Independent telephones as follows:

"In this place the American Express Company had two telephones, one connected to the Independent and one to the Bell exchange, and according to the general order, the Independent telephone was discontinued, although the Independent telephone company had more subscribers than were connected to the Bell exchange.

As soon as requested, the telephone was taken out, as we were unwilling to give free service, believing that any convenience thus secured to our subscribers would be more than offset by the unbusinesslike discrimination. Since then we have been informed by the other express companies that their gross receipts immediately jumped from fifteen to twenty dollars per day, and it is fair to presume that this gain was made at the expense of the American Express Company.

"When the American Express Company's telephone was taken out we instructed our operators to shift all express calls to the other express companies, informing the calling subscribers that the American Express Company had no telephone, but that we could give them the Wells-Fargo or the United States Express Companies. We have also drawn the attention of our stockholders and friends to the action of the American Express Company, and invariably they have transferred their business to the other companies as far as possible.

"Through the discontinuance of our telephones by the American Express Company we now receive the entire toll business from one of the other companies, which far exceeds the amount of rental paid by the American Express Company. We have not lost a telephone on account of the discontinuance of our service by the American Express Company. In fact, the net result has been a greater revenue for us, but the situation seems to have caused a loss to the American Express Company rather than to ourselves. If they can stand it we can."

Saskatchewan Active in Constructing Provincial Telephone System.

The province of Saskatchewan has lost no time since the organization of the Department of Telephones and Telegraphs in carrying out its plans for a complete telephone system throughout the province. The government's telephone legislation only became law two months ago, but already contracts have been let for the building of over 400 miles of long distance lines and all the necessary material for the construction of these lines has been ordered by the department, as well as the supplies for additional lines for which the contracts have not yet been let. In addition to the government lines several dozen rural companies have been organized or are in course of formation throughout the province.

The contract for the building of the Lumsden-Saskatoon line, a distance of 180 miles, has been let to J. S. Bartleman, of Regina, Sask., at $79.75 per pole mile. Prices for the construction of this line ranged from the price of the awarded tender to $120 per pole mile. The line to connect Regina and Antler, a distance of 220 miles, has been let to the Moosejaw Telephone Company, Moosejaw, Sask., at $79.50 per mile, the tender of J. S. Bartleman being 25 cents per pole mile higher. From Antler a couple of miles of line will be built to connect with the Manitoba government system at Sinclair, arrangements having already been made with the Manitoba Telephone Commission. The poles for the lines will all be 25 ft. in length, but those in the northern portion of the province will be somewhat heavier than those in the south. All wires strung will be copper metallic circuits. The wire to be used on long distance lines is No. 10 New British Standard copper, weighing 262 lbs. to the mile for each individual wire, and being of the same quality as that used in the long distance line between Winnipeg and Regina, one of the best lines built by the Bell company in Western Canada.

It is the intention of the government to establish toll stations along the routes of the lines at places where there is not already a telephone system, or where the system is owned by the Bell company. The supplies are already beginning to arrive, and construction work will be commenced on these lines as soon as the railroad companies can deliver the poles.

In an important speech at Rosthern, on Aug. 26, Premier Scott stated that the government will not only build trunk lines, and aid in development of systems in rural territory at present without telephones, but will also purchase the Bell plant in the province and the Saskatchewan company's system which centers at Moosejaw.

Bell Rates in Connecticut Lowered.

Reports appearing simultaneously in the newspapers of four of the principal cities in Connecticut announce material reductions in the rates of the Southern New England Telephone Company. The cities in which this reduction applies are Bridgeport, Hartford, New Haven and Waterbury. The newspapers refer to the change as follows:

"In substance, the company's plan contemplates the provision of single line domestic service in these four cities at the rate of $36 per annum. This rate will be applied to those existing subscribers who are at present paying net charges of $40 per annum in Waterbury and $48 per annum in Bridgeport, Hartford and New Haven for a strictly domestic single line service and will be offered to new subscribers desiring such service. The two-party line service at present furnished in Bridgeport, Hartford and New Haven at the rate of $36 per annum will be discontinued, and the existing subscribers to domestic service at that rate will be provided with single lines, at the same rate."

While one of the objects of this change is to promote the discontinuance of party line service, in accordance with the recognized Bell policy, the subscribers of the company are ascribing the reduction to the activity of the Independent company which is building up a large following throughout the state. This is another instance of the power which even the prospect of competition has to bring about more favorable terms to the public. It provides the Independent company with a strong argument to use in its attempt to show that its operation is a public necessity, inasmuch as the people of Connecticut will henceforth consider themselves justified in looking for still further reductions in rates as soon as the new company can obtain franchises, and actually get its plant in operation.

Large Attendance at Independent Convention in North Carolina.

The third annual meeting of the Independent Telephone Association of North Carolina was held at High Point Aug. 12. There were nearly one hundred representatives of the 200 Independent telephone companies throughout North Carolina, this being the largest attendance in the history of the association. An all day session was held and many matters of importance came up and were acted upon.

Very encouraging reports were made on the growth of the Independent companies from every quarter. Many toll lines have been put up the past year and many more are now in course of erection or contemplated. The increase in the number of local telephones in the various towns and cities throughout the state was also very gratifying. The Independent companies now have a perfect network of systems throughout the state, reaching about every point of importance. It was shown at this meeting, as it was known before, however, that from 85 to 95 per cent of the telephone business is done within from twenty to fifty miles of where it originates, and over half in the cities and towns where the service is installed, there being practically a very small percentage of long distance service outside of these limits.

The officers of the association elected for the ensuing year are: President, W. A. Wynne, Raleigh; vice-president, Mayor H. P. Grier, Statesville; secretary and treasurer, B. W. Leavitt, Southern Pines.

Projects for Extension of Communication Systems in Australia.

Mr. John Hesketh, electrical engineer of the Postmaster General's office, in Australia, estimates that to meet public requirements in connection with telephone and telegraphic works during the next three years, £2,100,000 will be required. The question of arranging a financial system by which the postal and telegraphic department might more conveniently secure the money it requires to carry on its services, is to be considered. Each state will benefit as follows: New South Wales, £900,000; Victoria, £700,000; Queensland, £160,000; South Australia, £140,000; Western Australia, £140,000; Tasmania, £60,000. This would not include provision for such undertakings as telephone exchange buildings, but it would be expended in revenue-producing works.

Erie Railroad Will Try Telephone Dispatching.

Orders have been received by Chief Dispatcher John O'Laughlin, of the Erie Railroad, to put in operation at once a telephone system for train dispatching between Meadville and Corry, Pa. It is expected to have the telephone system in working order between these two points this week, and if it is found to work satisfactorily, the system will be extended over the entire line.

Some ten stations will be affected by the new order, but it will not at present relieve many operators from work. If found to work in a satisfactory manner and adopted the new system will have the effect of reducing expenses very materially. The telephone system of train dispatching is now being tried on a number of the leading roads of the country and success is generally reported.

Montana Independent Opens Anaconda Exchange.

On the 1st of September the Montana Independent Telephone Company opened its exchange at Anaconda for local business as well as for toll connections with Butte, the latter line having been completed a few days before. With only a brief solicitation for subscriptions the company began business with 400 telephones in use, including nearly every business house and a large number of residences. Quite a number of Anaconda people are represented financially in the company. The system in Anaconda required 1,500 miles of wire. The wires are underground in the central part of town, and there are several miles of underground conduits, through which lead-covered cables run. Very few open wires are used, and these are only on the outskirts of town. Practically the entire wire system of the Independent company is cable, including 40,000 ft. of lead covered cables, each carrying 25 to as high as 200 pairs. Aside from the poles, six cars of material were used in the installation of the Anaconda plant.

The exchange occupies the building at the corner of Commercial avenue and Oak street, formerly used for offices by the electric light company. In the main room of the building is the switchboard. It is an eight-panel three position board, and is equipped with immediate capacity for 500 telephones, and an ultimate capacity of 3000 telephones. The power for operating the common battery exchange is furnished from Chloride Accumulator duplicate storage batteries. The exchange power equipment includes a specially designed switchboard, with necessary voltmeters, etc. There are two through service lines to Butte. The company starts off in Anaconda under most auspicious circumstances.

Druggists in New Orleans Combine to Use Pay Stations.

The following from the New Orleans *Picayune* tells in an interesting way the story of a satisfactory solution of a problem which is a vexatious one in nearly every city in the country:

"Weary, after a quarter of a century, of the free and indiscriminate use of their telephones by the public, the druggists of New Orleans have combined and, by universal consent, have agreed to have the telephone company install pay telephones in their stores. It is said that there is hardly a single exception to this rule, the druggists having got together with wonderful unanimity.

"For twenty-five years the public has felt free to use the

druggist's telephone. Men in a hurry to send a message; women who wished to talk to acquaintances; girls who wanted to gossip with their friends; boys who must have a word with their sweethearts—all, with one accord, went to the drug store and used the druggist's telephone. It has been used so universally and constantly that the public has come to regard it as the property of the public, but the druggists think otherwise.

"Some of them awakened recently to the possibilities of pay telephones. From time immemorial they have been paying business rates on one or more telephones which have been installed and devoted exclusively to the public use. Their private telephones, made necessary by the constant use of the others, have been installed in the rear of their stores beyond the reach of the imposing public. Druggists have, therefore, been paying double rates for their telephones, because they have had to have twice as many as the butcher, baker and candlestick maker.

"Recently some of them installed pay telephones in their stores and results soon became apparent. They were not required to pay anything for incoming messages, and the nickels which the public dropped into the slot made up a sum the druggist's share of which more than paid for his own use of the implement. Some of those who had private as well as public telephones found that the receipts from the public telephones more than paid for their private lines.

"In order that customers might not be offended, or that they might be offended, if at all, by all druggists at once, the druggists decided to install their new telephones simultaneously, and work has just begun putting the new instruments in. The public will be permitted to use them as much as the public pleases at five cents per."

If the druggists can get together for their own good and that of the telephone company in New Orleans, why not elsewhere?

Cubans Want to Own Telephone System.

Out of the complicated situation arising from franchise contests in Cuba, which have hindered development of communication facilities, there has arisen recently a demand for government ownership of the telephone and telegraph systems.

It is a fact perhaps not generally known that government ownership of the telegraph lines already exists in Cuba and in a recent test made by Governor Magoon, at the request of the President, the verdict was strongly in favor of the telephone system being taken over by the government also.

At present the Cuban telephone system is controlled by private interests. The franchise expires in 1910, when, under the terms of the grant, the government may, if it so desires, take over the entire plant.

For the purpose of ascertaining the wishes of the people, the President recently instructed Governor Magoon to prepare a general franchise law and submit it to the provinces. Under this suggested law the present telephone company, because it is the only one on the ground and has a well equipped plant, would have secured a permanent monopoly on the island.

"I submitted the proposed law to the eighty-two provinces on the island," said Governor Magoon today, "and so far I have had replies from fifty-two. Of these only five are in favor of the franchise law and it does not seem that the proportion in favor of it will be altered when all of the replies are in."

International Congress of Telegraph and Telephone Engineers.

On Sept. 21 next the first International Technical Congress is to be opened at Budapest. The proposal to hold the congress emanated from the French administration, and was supported by the Hungarian administration; the technical staff of the latter succeeded, with the support of their minister and their director-general, in arousing the interest of other administrations, of which the following are sending delegates to the congress: England, France, Germany, Bavaria, Austria, Italy, Belgium, Holland, Denmark, Sweden, Roumania, Bulgaria and Servia. A series of highly interesting papers will be distributed to the members before the opening of the congress in English, French, or German, and the discussions are to be held in these languages. Arrangements have been made by the technical staff of the Hungarian administration to enable the members to visit the various installations at Budapest, as well as the large electric plants and factories where telegraph or telephone material is produced. The congress will meet at the premises of the Hungarian Engineers' and Architects' Association, and the Hungarian committee entrusted with the arrangements will shortly distribute the detailed program of the congress. Those who are interested in the congress should apply for information to Mr. Endre Kolossvary, Chief of the Technical Department, Direction-General of Posts and Telegraphs, 11, Albrecht ut 3, Budapest.

A New Telephone Company for Athens, Ga.

It is reported that a new telephone company is to be organized in Athens, Ga. The proposed company intends to ask for a franchise and immediately solicit contracts for telephones. It is also making preparations for a building from which lines will be run to all sections of the city. Many prominent citizens are interested in this movement, and it is expected that the new company will be organized within a short time.

Protest Against Cumberland Rate Raising in Louisville.

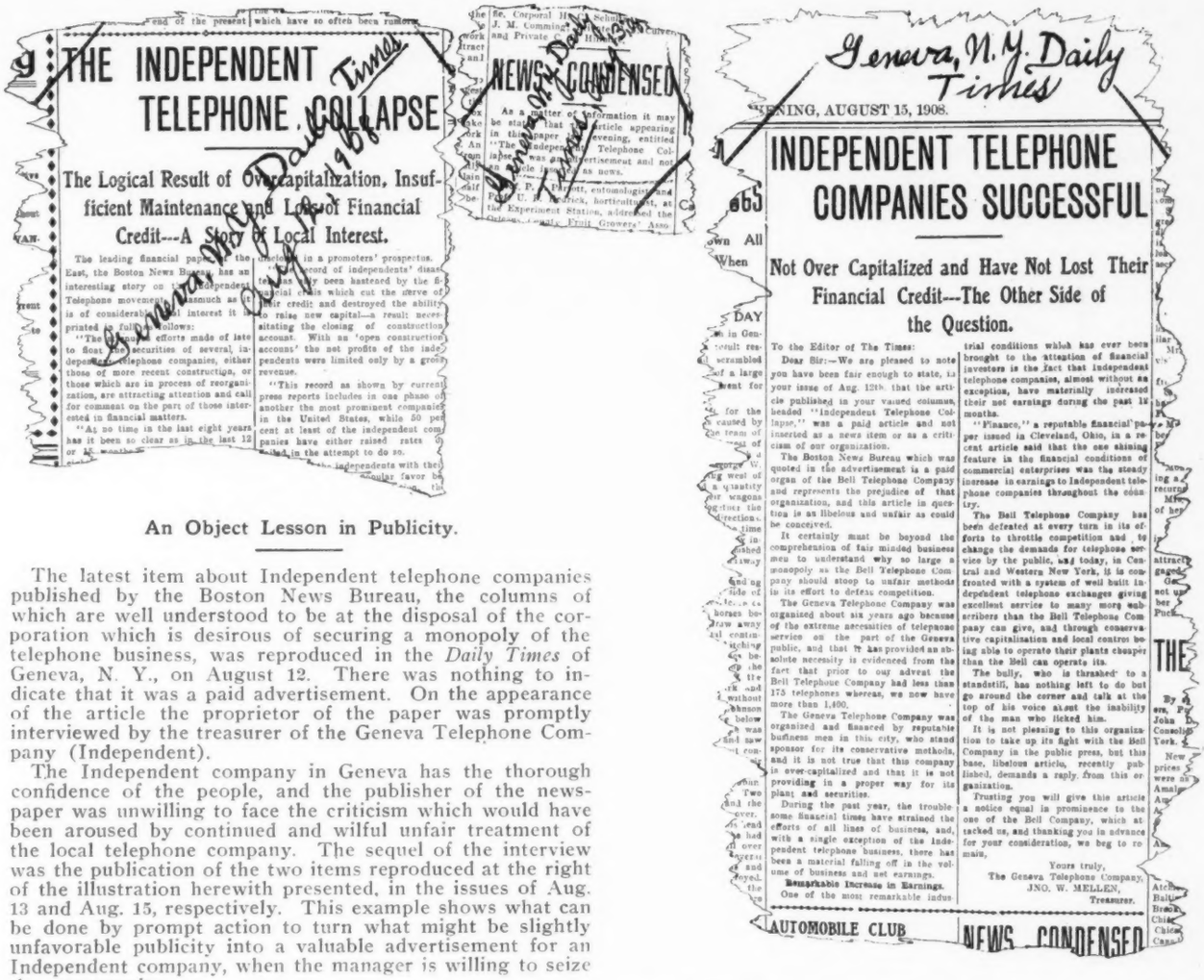
A general protest has been made against the raising of rates by the Cumberland Telephone & Telegraph Company (Bell) in Louisville, Ky. New rates on an advanced scale have been quietly put in force for some time past, but it is only recently that any general objection has been made.

Now it is charged that the company has violated an agreement made last year with the Board of Trade.

President Nunemacher of the Board of Trade has decided to investigate the situation and has appointed for this purpose a committee composed of Marion E. Taylor, chairman; Logan C. Murray, W. R. Belknap, Hardy Burton and Charles E. Currie. Several of these men were members of the committee which looked into the rates last year, and which reported that there was maintained a fair rate and arranged a schedule which was to be in force for three years. The committee will confine itself to the reported violation of the agreement. The work of the former committee, they say, was accurate and in accord with the facts as presented to them. The Cumberland officials deny that they have departed in any way from either the spirit or the letter of the agreement. "The company," said G. G. Hall, the superintendent, "is gradually raising those rates which were below the schedule as agreed upon between us and the Board of Trade. Some were above the schedule and some below, and we have been working to make them all conform. It takes time to do this, as we have to examine the rates in city districts. The report that our rates have been raised and that our percentage of profit is increased is false."

Another Rate Complaint in Oklahoma.

The Oklahoma Corporation Commission arranged to hear the complaint of the citizens of Krebs against the Pioneer Telephone & Telegraph Company (Bell) on Sept. 4. The petition sets forth that the company is charging excessive and discriminating rates, that the service is poor, and that the company has violated its charter in various instances.


THE INDEPENDENT TELEPHONE COLLAPSE

The Logical Result of Overcapitalization, Insufficient Maintenance and Loss of Financial Credit---A Story of Local Interest.

The leading financial paper of the East, the Boston News Bureau, has an interesting story on the Independent Telephone movement, inasmuch as it is of considerable local interest it is printed in full as follows:

"The unusual efforts made of late to float the securities of several independent telephone companies, either those of more recent construction, or those which are in process of reorganization, are attracting attention and call for comment on the part of those interested in financial matters.

"At no time in the last eight years has it been so clear as in the last 12

NEWS CONDENSED

As a matter of information it may be stated that the article appearing in this paper on Friday evening, entitled "The Independent Telephone Collapse," was an advertisement and not a news article, as news.

Geneva, N. Y. Daily Times

EVENING, AUGUST 15, 1908.

INDEPENDENT TELEPHONE COMPANIES SUCCESSFUL

Not Over Capitalized and Have Not Lost Their Financial Credit---The Other Side of the Question.

To the Editor of The Times:

Dear Sir:—We are pleased to note you have been fair enough to state, in your issue of Aug. 12th that the article published in your valued columns, headed "Independent Telephone Collapse," was a paid article and not inserted as a news item or as a criticism of our organization.

The Boston News Bureau which was quoted in the advertisement is a paid organ of the Bell Telephone Company and represents the prejudice of that organization, and this article in question is as libelous and unfair as could be conceived.

It certainly must be beyond the comprehension of fair minded business men to understand why so large a monopoly as the Bell Telephone Company should stoop to unfair methods in its effort to defeat competition.

The Geneva Telephone Company was organized about six years ago because of the extreme necessities of telephone service on the part of the Geneva public, and that it has provided an absolute necessity is evidenced from the fact that prior to our advent the Bell Telephone Company had less than 175 telephones whereas, we now have more than 1,400.

The Geneva Telephone Company was organized and financed by reputable business men in this city, who stand sponsor for its conservative methods, and it is not true that this company is over-capitalized and that it is not providing in a proper way for its plant and securities.

During the past year, the troublesome financial times have strained the efforts of all lines of business, and, with a single exception of the Independent telephone business, there has been a material falling off in the volume of business and net earnings.

Remarkable Increase in Earnings.

One of the most remarkable industrial conditions which has ever been brought to the attention of financial inventors is the fact that independent telephone companies, almost without an exception, have materially increased their net earnings during the past 18 months.

"Finance," a reputable financial paper issued in Cleveland, Ohio, in a recent article said that the one shining feature in the financial conditions of commercial enterprises was the steady increase in earnings to Independent telephone companies throughout the country.

The Bell Telephone Company has been defeated at every turn in its efforts to throttle competition and to change the demands for telephone service by the public, and today, in Central and Western New York, it is confronted with a system of well built independent telephone exchanges giving excellent service to many more subscribers than the Bell Telephone Company can give, and through conservative capitalization and local control being able to operate their plants cheaper than the Bell can operate its.

The bully, who is thrashed to a standstill, has nothing left to do but go around the corner and talk at the top of his voice about the inability of the man who licked him.

It is not pleasing to this organization to take up its fight with the Bell Company in the public press, but this base, libelous article, recently published, demands a reply from this organization.

Trusting you will give this article a notice equal in prominence to the one of the Bell Company, which attacked us, and thanking you in advance for your consideration, we beg to remain,

Yours truly,
The Geneva Telephone Company,
JNO. W. MELLEN,
Treasurer.

AUTOMOBILE CLUB NEWS CONDENSED

An Object Lesson in Publicity.

The latest item about Independent telephone companies published by the Boston News Bureau, the columns of which are well understood to be at the disposal of the corporation which is desirous of securing a monopoly of the telephone business, was reproduced in the *Daily Times* of Geneva, N. Y., on August 12. There was nothing to indicate that it was a paid advertisement. On the appearance of the article the proprietor of the paper was promptly interviewed by the treasurer of the Geneva Telephone Company (Independent).

The Independent company in Geneva has the thorough confidence of the people, and the publisher of the newspaper was unwilling to face the criticism which would have been aroused by continued and wilful unfair treatment of the local telephone company. The sequel of the interview was the publication of the two items reproduced at the right of the illustration herewith presented, in the issues of Aug. 13 and Aug. 15, respectively. This example shows what can be done by prompt action to turn what might be slightly unfavorable publicity into a valuable advertisement for an Independent company, when the manager is willing to seize the opportunity.

Cumberland Telephone Company's Extra Charges for Service Through Submarine Cable.

Secretary Daspit of the Board of Trade at Baton Rouge, La., has received a letter from General Manager Hume of the Cumberland Telephone & Telegraph Company in response to a letter defining the attitude of the Board of Trade in the matter of the discontinuance of the service between Baton Rouge and West Baton Rouge, which was mentioned in a recent issue of the *American Telephone Journal*. Mr. Hume wrote: "I regret very much the position taken by the Baton Rouge Board of Trade. It seems to be that, unless a Board of Trade is to take the position that capital must be encouraged and protected, and that it must always have a fair and honest return on its investments, that the work of such a body must be along exceedingly narrow lines. The necessity for making a cable charge for Mississippi river cables is just as equitable as it is for a railroad company to make a bridge charge for Mississippi river crossings, and you know that this is universally done. The depreciation and hazard in the cable proposition is vastly greater than that in the bridge investment, and just how you would figure out the equity of this or any other company laying and maintaining submarine cables without making a charge for cable service is more than we can understand. Certain it is that, unless such charge is authorized, our stockholders will not agree to put up any more money for submarine cables; and, knowing the facts as we do, the officers of the company could not expect the stockholders to take any different position."

So strong is the public sentiment aroused against the Bell company on account of its failure to provide the service steps will be taken toward organizing an Independent service on both sides of the river, and offers of subscriptions for stock have already been made.

Improvements Made by an Oklahoma Company.

At the annual meeting of the stockholders of the Home Telephone Company, held Aug. 26 at Ozark, Okla., the following board of directors were elected for the ensuing year: W. L. Wagner, J. T. Greer, W. J. Pindergrass, L. L. Ford and M. B. Conaster.

New equipment has been installed both at Altus Dening and Ozark, and much of the line has been rebuilt, so that Ozark has two of the best telephone exchanges in the state.

A Troublesome Trouble.

When Reuben Landis and Grant Christian, Northampton, Pa., opened a cable box at the top of a fifty-foot pole, in search of trouble, they found it. The cable box was full of bees. As soon as they were disturbed the bees showed fight, and the men were forced to make a hasty descent down the pole. Before the bees were ejected from their hive, both men were badly stung. More than ten pounds of honey were taken from the box.

Mine Telephone Saves Lives.

Reports from Montrose, Col., state that on Aug. 21 fifteen workmen employed in driving the west end of the Gunnison government irrigating tunnel had a miraculous escape from being drowned. A huge cloudburst which broke in the gulch just above the west portal of the big bore flooded the powerhouse floor to a depth of eighteen inches, put out the fires, which stopped the dynamos and fans, spread out over the level stretch near the powerhouse, under which the tunnel is driven, and broke through the roof of the tunnel. Warned of the danger by telephone, the men working at the breast of the tunnel ran to the incline shaft, a mile from the breast, where they gained a point of safety just as the water reached that point.

Successor to California Wireless Telephone Company.

Albert Jahnke, who was the head of the Oakland Transcontinental Aerial Telephone and Power Company, of Oakland, Calif., recently put out of business for the alleged fraudulent use of the mails, has organized a new corporation known as the Jahnke Aerial Telephone Company. The capital stock is given at $200,000.

After an investigation by Detective Walter J. Petersen into the apparatus used by the Oakland Transcontinental concern, the promoters, including Jahnke, Wade H. Shadburne, Harry P. Dwyer, W. F. Allen, R. W. Bardach and J. R. Allen, were arrested on April 29 and 30 by Postoffice Inspector J. O'Connell and Deputy United States Marshall Towle, charged with having used the mails to defraud.

It was charged that the telephones had a metallic connection, that they had no commercial possibility of usefulness and that the public was being defrauded through the mails by the concern's advertisements.

Several of the officers were held for trial by Commissioner Heacock.

Complaint Against Hotel Telephone Charges in Wisconsin.

President Frederick L. Gross, of the newly organized National Travelers' Association of America, has filed a complaint with the Wisconsin Railway Rate Commission in Madison against the Wisconsin Telephone Company (Bell), which strikes the managers of the hotels. The complaint alleges that while the ordinary charge for the use of the telephone in a hotel is five cents, the traveling men are obliged to pay ten cents when they telephone from their rooms in the hotel. President Burt, of the telephone company, does not deny the report that patrons who use the telephone in their rooms are charged 10 cents a call, but says that it is the result of the hotel managers' policy. They maintain operators for the accommodation of this class of patrons and make the extra charge as compensation for operating the branch exchange. The complaint will be investigated by the rate commission.

Telephone Fire Alarms.

The following is a good suggestion, printed in the columns of the newspapers at Boise, Idaho:

"All persons living within the city limits are requested by fire department officials to remember that when sending in a telephone alarm the nearest street corners should be given, instead of the house numbers. This request is made to avoid the confusion which has resulted in the past in catching the exact number when it is mentioned, the person sending in an alarm, as a rule, being too excited to speak distinctly. Moreover, the observance of this suggestion will be of help to the firemen, who will not be required to guess at the locality, especially on the streets which run from north to south, where the location cannot be known instantly, as in the case where the streets run from east to west here."

This also shows the extent to which reliance is now placed on the telephone as a safeguard to property in the average city.

New Independent Toll Line in Montana.

A correspondent states that the Eastern Montana Telegraph Company, of Glendive, Mont., which is engaged in building a telephone line from Glendive to Miles City, has completed the line as far as Terry. The connection between Miles City and Forsyth is completed, and when Forsyth and Billings are connected service will be given from Helena and Butte to Glendive.

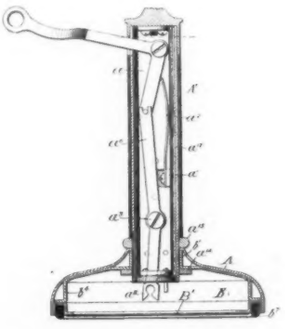
Telephone Patents

Desk Stand.

Sidney A. Beyland, Elyria, Ohio, Patent No. 896,796, Aug. 25, 1908.

This relates to a combination enclosing shell for the base and desk stand, and inside the standard a removable support, *a*, which carries the switch hook and the operating levers. The support is provided with means for retaining it in its proper place when inserted into the standard.

Co-operating with the lever projecting from the tube is a linkage for operating the hook switch springs, which are mounted upon a removable plate in the base, and properly alined in such a manner as to find its proper resting place in the base to co-operate with the switch hook lever when the plate is mounted in the base. This plate not only carries the switch hook springs, but also the induction coil, and the terminal clips, from which lead the desk set cords. The tube carrying the switch hook is further provided with prongs, which are connected with the transmitter, and which connect with springs insulated from and mounted upon the base. The prongs in the standard are so arranged as to register accurately with the prongs of the transmitter support when the latter is inserted in the tube. The plate carrying the induction coil and other parts is so arranged that it can be inserted into the base or removed therefrom, and another plate inserted. The purpose is to have the plates fit the remaining



parts of the desk set, so that, for example, the same standard may be fitted with plates for different circuits; that is, either magneto or common battery, or different types of common battery circuits.

Further constructional features involved are the strengthening of the base and the deadening leather ring used in the base of the desk set.

Step by Step Selective System.

J. A. Hulit, Topeka, Kan., patent No. 896,832, Aug. 25, 1908.

This patent relates to a step-by-step call system, in which it is possible to call from the central station not only any one of a plurality of signal receiving stations mounted on the same line, but in addition any desired group or series of single receiving stations.

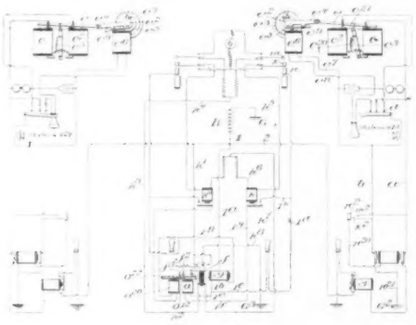
This system is adapted for use in connection with telegraph circuits, for operation on which it is principally designed, and is so arranged that the Morse signals of dots and dashes will not affect the operation of the selecting mechanism of the signaling apparatus.

Individual Telephone Station Meter.

Newman H. Holland, Brookline, Mass., patent No. 896,830, Aug. 25, 1908.

This invention is designed to provide a meter at a telephone substation, which meter, when its associated receiver is removed from the switch hook, is placed in condition for operation, but which will not be operated fully until the receiver from the called line is removed from the switch hook, thus completing the connection.

The device comprises a pole-changing switch, *f*, at the central office, operated through the medium of controlling relays



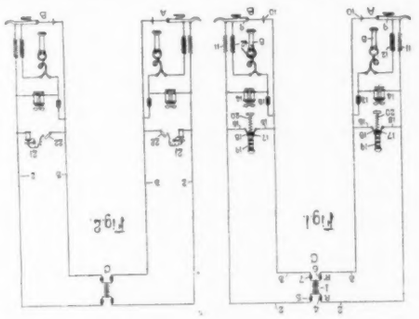
h and *h*", one being under the control of the calling line, and the other under the control of the called line. When the receiver of the calling line is first removed from the switch hook, battery of one polarity passes over the line and places the meter in condition for operation, and when the receiver of the called line is removed, the pole-changing switch is actuated and reverses the current passing over the calling line, thereby operating the meter.

The two electromagnets which operate the pole-changing switch at the central station, if operated separately, will not cause actuation of the pole-changing switch, but when both are energized, as when both receivers are removed, the pole-changing switch operates, thus completing the registration of the meter.

Signaling System.

John J. Kelly, St. Louis, Mo., No. 896,836, Aug. 25, 1908.

This invention is designed to provide means whereby when



two telephone lines are in service and one of the subscribers is called away from the telephone temporarily, the subscriber with whom he is talking does not need to remain at the telephone pending the return of the first subscriber. He may also leave the telephone, and when the first subscriber returns, he operates a call device which actuates a signal at the other end of the line. The idea is that neither of the telephones need be replaced on the switch hook, so that no disconnection of the line need be effected.

The device comprises the ordinary polarized bell, 14, connected through a condenser, 13, to the line at the telephone and a special signaling key, 19. Repeating coils are shown in the cord circuit of an ordinary common battery type.

By means of a device, 19, on the telephone, there may be set up in the line current fluctuations which are transmitted through the repeating coil at the central station, and operate the bell at the connected station. It is, of course, necessary in this system that the bell be not disconnected when the receiver is removed from the switch hook.

Manufacturers' Department

The Standard Telephone Manufacturing Company.

Three years ago the Knox-Dickey Telephone Manufacturing Company was organized for the purpose of taking over the Drake Telephone Company, of McConnelsville, Ohio, which was at that time making a four-party common battery and magneto telephone. The company had quite a successful career in a small way, business increasing each season until last November, when it purchased the plant, patents and good-will of the Williams Telephone & Supply Company. This company directed all of its efforts to the production of magneto telephones and switchboards, and the product is reported to have been satisfactory and popular in all rural communities where it was known. This plant was moved to Portsmouth and combined with the flourishing little plant of the Knox-Dickey Telephone Manufacturing Company, and run under this name until January, when the Standard Telephone Manufacturing Company was organized to take over this entire business.

At the head of this company as president is William R. Fee, general manager of the Portsmouth Telephone Company, who is a man of a great deal of experience in the telephone business and is in a position to know what operating men want and demand in the way of telephone apparatus. The vice-president of the company is John E. Williams. He is a man of large manufacturing experience and endowed with enthusiasm and a spirit to fight and win. The secretary and treasurer is E. W. Rardin, a young man of strong qualifications and demonstrated business ability.

The Williams Telephone and Supply Company specialized on magneto apparatus. The Knox-Dickey company gave most of its attention to central energy equipment. The Standard Telephone Manufacturing Company, having absorbed both, continues to manufacture the products of both. With its excellent

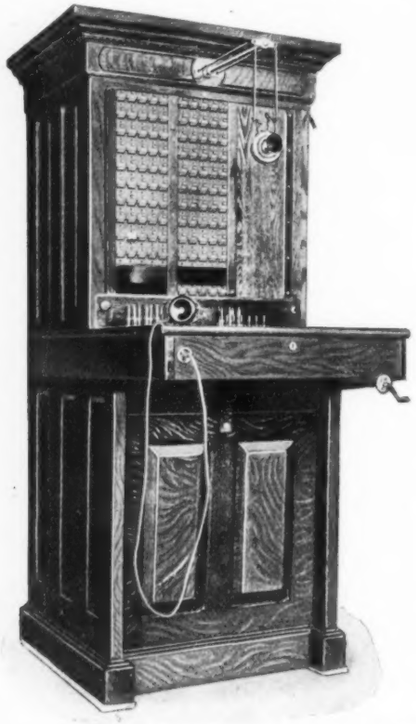
engineering corps, however, it has succeeded in making several very important changes and improvements in the apparatus. With these improvements has come such increase of business that the company's product is now sold in every state from ocean to ocean.

The Standard company's apparatus, including switchboards, wall telephones, desk sets, drops, receivers, etc., is covered by the following guarantee:

"All Standard apparatus when properly installed and operated is fully guaranteed to satisfactorily perform the service for which it is intended.

"Any part or parts which prove defective through inherent defects of material or workmanship will be cheerfully repaired or replaced without charge."

One of the most interesting products of the Standard factory is the apparatus for its four-party selective signaling system. In working out this system the inventor carried out the idea of ringing the selective bells with an alternating current without regard to the frequency or voltage of the ringing generator,



Standard Telephone Manufacturing Company's Magneto Switchboard.

thus permitting the system to be operated by any of the ordinary ringing machines or hand generators in common use, and respond to the current from such machines when revolving at any speed.

The system is claimed to be especially adapted to the smaller class of exchanges for the reason that there is no extra expense incurred in installing and maintaining special ringing machines at the central office and to the fact that the subscriber's telephone consists of the fewest elements possible.

The selective bell or ringer is of the usual bridging bell type except that it is provided with a special winding. A special german silver resistance coil is connected in the bell circuit which permits ringing current to actuate the bell, but effectually prevents common battery current from flowing through the bell to interfere with the operation of switchboard signals and apparatus. The bells ring with alternating current and the silent bells are locked in their selective operation by means of steady current such as is supplied from dry battery or any type of direct current generator or dynamo. A dry battery of 60 cells is usually employed to effect the selective operation of the bells, 30 cells being connected positive and the remaining 30 cells being connected negative to the alternating ringing gen-

Standard Company's Common Battery and Magneto Wall Telephones.

erator. It is claimed that this battery will give many months of service under all ordinary conditions, will suffice for 1,000 party line telephones, and will selectively operate 25 party lines or 100 telephones simultaneously.

The company offers to make installations of this system on common battery or magneto systems of almost any type.

A Pioneer in Wisconsin Telephone Circles.

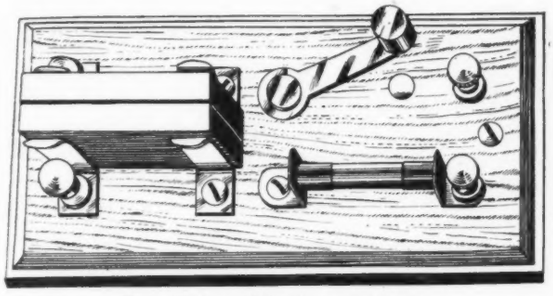
Henry L. Elston, president and manager of the Elston Telephone & Electric Manufacturing Company at Muscoda, Wis., has been continuously engaged in the telephone business for

Henry L. Elston.

sixteen years. After receiving an excellent electrical education in the University of Wisconsin and returning to his home town, he found that a great deal of interest was being manifested in a new industry—the telephone business—chiefly on

account of the exhibits and demonstrations which many Wisconsin people had seen at the World's Fair, then being held in Chicago. He undertook to install and did, as a matter of fact, successfully install several plants in his immediate vicinity; and encouraged by these successes, although they were attended by unusually hard work and difficulties in the way of getting suitable apparatus and supplies, he extended his labors to adjacent territory. Within the next few years he had installed a large number of telephone systems in southern Wisconsin, and his manufacturing business ran as high as 2,680 telephones a year. Mr. Elston's reputation spread, and the demand for his services increased until he had completed systems in eleven states of the Union.

During the past few years, he has been operating upon a more conservative basis, devoting his attention more particularly to inventions and the production of sundry specialties. One of his leading specialties is the Elston lightning arrester, illustrated herewith. This arrester is accompanied by an absolute guarantee that all telephones with which it is equipped will be replaced or all damage repaired if they are injured by lightning or other electrical currents. Mr. Elston has prepared some unusually attractive circular matter bearing upon his lightning arrester and bridging telephones.



The Elston Lightning Arrester.

W. & M. Telephone Wire News for August.

One of the regular publications of the American Steel & Wire Company of Chicago and New York, is the *W. & M. Telephone Wire News*. It is most attractively arranged and contains information of real value to telephone men, whether they operate large or small systems.

The August number contains several pages of information about telephone wires and lines. This information, being complied direct from foremen's and engineers' notes and reports, comes "straight from the soil," and is correspondingly practical.

The article, "Stringing Telephone Wires," contains some good pointers on splicing and kindred operations, and states that in handling wire care should be taken not to kink or jam it. A short kink is sure to break under a heavy strain. In placing a coil upon the reel care should be taken that it is so placed that the wire will unwind from the upper and outer side of the coil. To do this it is necessary to trace the wire back at least a half dozen wraps, to make sure that the end has not slipped under or through the coil in the process of handling.

Much depends on proper splicing. Iron wire should have at least three inches between the "buttons," this space to be so twisted as to form two and one-half turns. The buttons are formed by turning the ends about the line wire six times at each end. Wonderful have been the methods of splicing, some of which are shown in the accompanying illustration, and all of which add to both cost and inferiority of service.

The matter of "tying" is of great importance. The tie should be the same size as the line wire, but softer if possible. On copper, a special annealed tie is used. Iron, however, is usually tied with the same wire used in the line. Here a nice judgment is necessary to obtain good results. The tie should be placed and twisted about the glass and line wire, and great care taken so as to get the proper tension. If the twist is too tight the wire is kinked and in time will break. If too loose, the wire vibrates and will slowly cut off. The tie should be of sufficient length to leave an end long enough to be easily secured either by hand or with a pair of pliers and untwisted without ruining the tie, in case it becomes necessary to loosen it for any purpose. These ends are usually bent down and in toward the glass.

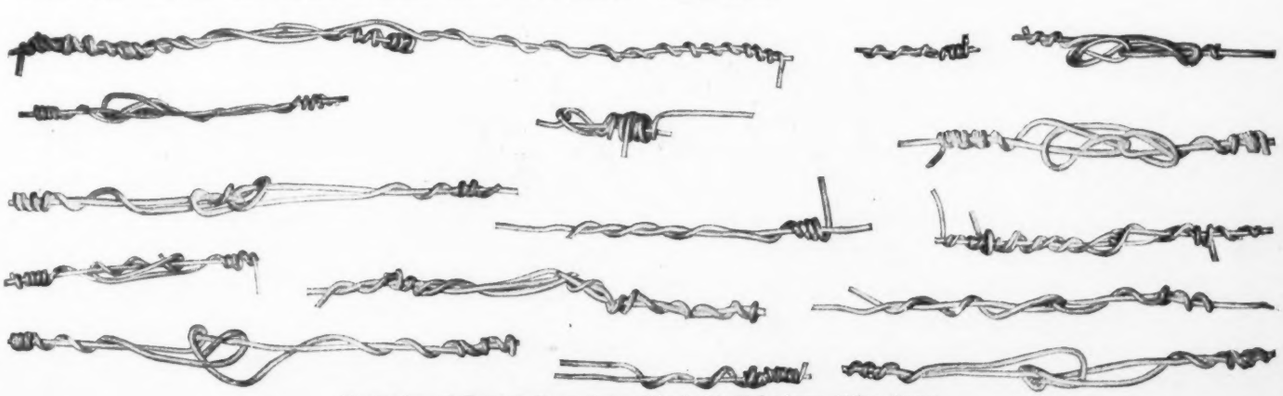
All splices of conductors should be soldered. Care should be taken to see that the fluxing of the solder with the metal of the wire is perfect. Tallow should always be used, as acid eats into the spelter and causes it to rust rapidly. This will save many times the additional construction cost by greatly reducing the cost of maintenance. Failure to solder is inexcusable except under the most adverse conditions, and is certain to cause trouble and poor service.

Other articles of equal excellence are "Maintaining a Telephone Line," and "How Telephone Wire Is Made."

Stromberg-Carlson Company's New Circulars for Operating Companies.

The Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., has taken a step beyond the mere advertising of its product in furnishing exchange managers with the means of advertising their service to subscribers. A series of four extremely attractive folders extol the convenience and advantages of extension telephones, and are intended for distribution by the operating company in the territory served by it. The imprint of the company ordering the circulars is placed neatly at the end of the reading matter.

The Stromberg-Carlson Company has spared no expense in the design and general artistic finish of the folders. Doubtless some of TELEPHONY's readers have already seen the first of these circulars to be issued, the No. 149. Those who have will be the first to make arrangements for a full supply of the entire series.



Examples of Poor Splices, from W. & M. Telephone Wire News.

It is stated by the Stromberg-Carlson Company that most of the exchanges equipped with its apparatus have eagerly adopted the folder scheme. This will be interesting to other exchange managers who are equally as likely to find that tney are good business getters.

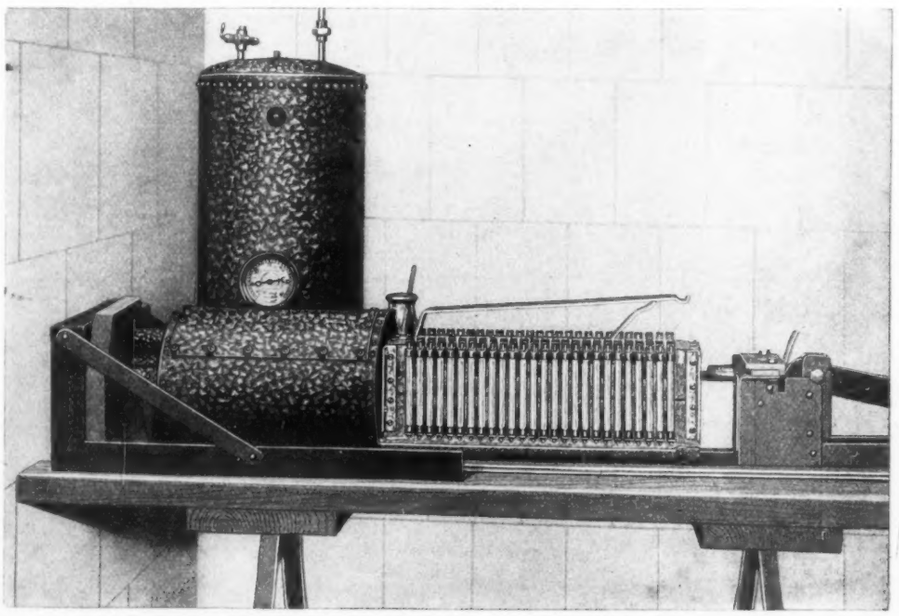
This plan of constructive publicity represents the highest type of advertising skill, and possesses all the merits of novelty in the telephone field. It is another demonstration of the originality and vigor of Mr. H. C. Slemin, who, as advertising manager of this firm, has for some time past done so much to extend the favorable acquaintance with its products.

THE CRACRAFT, LEICH ELECTRIC COMPANY of Genoa, Ill., has just completed its second yearly inventory, marking its first anniversary. Although there has been a general depression in most lines, including the telephone business, its officers feel highly pleased over the amount of business transacted, as well as over the success the company is having with its new apparatus. The number of new customers added during the last six months has been very encouraging, and the increased number of inquiries received in the past few weeks indicates that the coming year will be a most prosperous one for the new concern.

F. H. HOLBROOKE is now treasurer and general manager of the Vote-Berger Company, La Crosse, Wis. Mr. Holbrooke was formerly a resident of that city, but for some years past has been successfully engaged in the manufacturing business at Chicago. The company also has secured the services of J. N. Wallace, formerly prominent in Chicago telephone manufacturing circles, who has been added to its engineering corps. Since the Vote-Berger Company is now equipped with a fine new factory and complete facilities for putting out a superior line of apparatus, it is not too much to predict that the coming year, with its promised improvement of trade conditions throughout the field, will see this concern secure its full share of business.

Moisture-Proof Pole Cable Terminals and Junction Boxes.

The accompanying illustration shows an interesting corner of the factory of Frank B. Cook, Chicago, Ill., where junction boxes and non-pothead terminals are tested for leakage. Special care is exercised in the construction and assembling of these types, and every precaution is taken to render them air-tight. The final inspection consists of testing each piece of apparatus under ten pounds air pressure, this being accomplished by connecting the piece to be tested with the machine shown in the illustration. The terminal or junction box is placed on a special frame, the air pipe being placed in the self-soldering nozzle with which these types of apparatus are equipped, and this nozzle is forced against a piece of solid rubber through which the air pipe extends. When the pressure is turned on the gage registers any decrease of pressure in the tank, thus detecting any leakage. A further test is to cover the joints with soapy water, the slightest leak causing a bubble to form at the point. These types of Cook apparatus are guaranteed to be moisture-proof.



Testing Frank B. Cook Junction Boxes and Terminals.

R. S. Mueller Opens Sales Offices.

The many electrical and telephone friends of R. S. Mueller will be pleased to hear that he has opened offices at 708 Electric Building, Cleveland, Ohio, as a general selling agent. Here he will represent in the territory of Ohio and West Virginia the following firms: Alfred F. Moore, Philadelphia, manufacturer of insulated wire and cables, and all sorts of telephone cordage; the Stackpole Battery Company, St. Mary's, Pa., makers of dry batteries and carbon products; the Warner-Newton Lumber Company, Grand Rapids, Mich., cedar poles and posts; the Yesbera Manufacturing Company, Toledo, builders of telephone booths; and the General Insulate & Machine Company, Brooklyn.

Mr. Mueller is a graduate in the electrical course of the University of Nebraska. Shortly after matriculating in 1898 he entered the telephone switchboard shops of the Western Electric Company at Chicago, spending two years in shop and installation work. Then followed two years in the Chicago office of the Westinghouse Electric & Manufacturing Company. He returned to the telephone field by entering the employ of the Kellogg Switchboard & Supply Company, and since July, 1904, has had charge of its Ohio office.

Mr. Mueller's experience well fits him for the success which is certain to attend his new venture.

A New Aluminum Alloy.

Morris R. Machol, 32 Park place, New York City, is sending out literature descriptive of magnalium, an aluminum alloy for which some remarkable claims are made. While lighter than aluminum, he says, it is stronger and less subject to corrosive agents; and unlike aluminum, it can be readily soldered, forged, and plated with nickel, gold or silver.

The following figures are given as showing tensile strengths of magnalium in various forms, in pounds per square inch: Castings, 19,000 to 42,500; forgings, 30,000; annealed plate, 42,000; hard rolled plate, 52,000; drawn wire, 41,000 to 53,000; drawn rod, 60,000; drawn tubing, 74,000. These tests would seem to indicate a greater strength, weight for weight, than any known metal.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants or systems.

SUPPLIES WANTED.

SERGENT, KY.—The Letcher County Home Telephone Company will shortly begin the construction of a local Independent telephone line from Vilas to Wright, ten miles, and will need supplies for the work, which will be started soon. W. B. Webb is manager.

NEW COMPANIES.

EL CENTRO, CAL.—The Home Telephone Company of Imperial Valley has been organized with a capital stock of $50,000 and the following directors have been elected: Fred Stahl, W. A. Edgar, Fritz Kolkke, Geo. Klein, Ira Aten, F. S. Webster, R. P. Sheperd, J. M. Baldwin and H. C. Goldrick. About 1,000 miles of line will be constructed and if possible an alliance may be formed with the Home Telephone Company of Coahella Valley, which covers the surrounding districts.

ALTOONA, IA.—The Rural & Four City Telephone Company has been incorporated. L. M. Grimes has been elected secretary. The company will install exchanges in Altoona, Mitchellville, Prairie City and Runnells.

PLAINS, KAS.—The Plains Telephone Company has been incorporated here with a capital stock of $15,000, and a telephone system will be installed.

HUGOTON, KAS.—W. B. Crawford has organized a new telephone company which will shortly begin operations in this vicinity.

HOBOKEN, N. J.—The Nantucket Central Railroad Company of New Jersey has been incorporated with a capital stock of $125,000. The incorporators are James Wade Walker, Morton R. Mortenson and William Cotten; to operate railroads, telephone and telegraph lines outside the State of New Jersey.

CHITTENANGO, N. Y.—Our Own Telephone Company has been incorporated here with a capital stock of $20,000. The incorporators are Daniel G. Gates, Addie P. Gates and John W. Gates, all of Chittenango.

CENTERVILLE, N. Y.—A telephone company has been formed here, with J. C. Vosburg, manager; V. O. Crowell, secretary; Nelson Hauber, treasurer. The object is to put up a line to the station of the B. & S. Railroad, which is a mile from the post-office; but later the line will probably be extended to Fairview. The plan will involve a connection with the Inter-Ocean line at Rushford and the spread of the system to the entire community.

COLUMBUS, O.—It is announced here that a company will be incorporated within a few days to lease the properties of the United States Telephone Company, the Cuyahoga Telephone Company of Cleveland, and the Citizens' Telephone Company of Columbus. Options have been taken on these properties by the new company. The United States Telephone Company, operating long distance wires, is capitalized at about $4,000,000. It operates over 12,000 miles of long distance wires connecting 300,000 Independent telephones and controls nine local companies. The Cuyahoga company is capitalized at $3,000,000, and the Citizens of Columbus at $700,000.

MARSHFIELD, ORE.—The Coos Bay Home Telephone Company of Coos county, has been incorporated here with a capital stock of $50,000. The incorporators are R. T. Durrett, J. Virgil Pugh and W. M. Douglas.

CENTER ROAD STATION, PA.—The Summit Independent Telephone Company, of Crawford county, has been incorporated here with a capital stock of $6,500.

M'VEYTOWN, PA.—The Ferguson Valley Telephone Company has been incorporated here with a capital stock of $5,000, and will soon commence the construction of a telephone system.

BERESFORD, S. D.—Articles of incorporation have been filed for the Beresford Telephone Company. It has a capital stock of $50,000 and will construct a general telephone system to cover all points in the southeastern part of the state.

INDEPENDENCE, WIS.—Articles of incorporation have been filed for the Independence Telephone Company. It has an authorized capital of $8,000 and the incorporators are: C. H. Short, Frank Wise, Peter Skroch, F. C. Cripps, A. J. Bautch, B. Brethauer and others.

PLUMMER, WIS.—The Clearwater Farmers' Telephone Company has been incorporated, with a capital stock of $10,000.

REGINA, SASK., CAN.—Local municipal telephone companies will be organized in the following cities: Balgonie, Hanley, Swift Current, Maple Creek, Melfort, Saltcoats, Wamsley, Sedley, Rouleau, Estevan, Briercrest, Weyburn, New Osgoode, Elmore Esterhazy, Condie, Wadena, Wilcox, Aberdeen and McTaggart. It is expected that the government will begin the construction of the long distance lines in August. Plans for the following long distance lines have been completed: A line running from Lumsden and Prince Albert, connecting with the towns along the C. & R. A line to serve the towns and villages along the Arcola and Estevan branches of the R. P. R. Branch lines east and west from Warman to the boundaries of the province and following the C. & R. Branch lines following the Wolseley-Reston, Pheasant Hills, Weyburn and Stoughton railways. A line, eastward from Prince Albert connecting Kinistino, Melfort, Star City, Kinsdale and other towns and villages. A line crossing the province from north to south and connecting Alameda, Carlyle, Wapello, Workton and Saltcoats. Branch lines will also be constructed to follow the railway branches.

REGINA, SASK., CAN.—The following companies have filed articles of incorporation: Milestone Southwestern Telephone Company; Herbert Rural Telephone Company; Okabena Rural Telephone Company; Long Grade Telephone Company and Halkirk Rural Telephone Company.

LANG, SASK., CAN.—The Lang Farmers' Mutual Telephone Company No. 2 has been incorporated.

NILESTONE, SASK., CAN.—A telephone company has been incorporated which will be known as the Northwest Telephone Company.

HARRISON, MAN., CAN.—G. Gray, J. Meikeljohn and E. W. Lambert have organized the Minto Rural Telephone Company, with a capital stock of $10,000.

FINANCIAL.

CHRISTINE, N. D.—The Eagle Telephone Company has increased its capital stock from $5,000 to $25,000, and will undertake much new work.

FRANCHISES.

WASHBURN, N. D.—A franchise has been granted to W. H. Allen for the construction of a rural telephone to Washburn from Goodrich.

FAYETTE CITY, PA.—The Fayette City Council has granted a franchise to the Independent Telephone & Construction Company. This is a corporation organized by men interested in the different Independent companies in the valley, solely for the purpose of promoting companies like the one just launched. The company was not started with profit as the object, but to organize local telephone companies which will in time take care of themselves.

FORT WORTH, TEX.—On account of the proposed increase of rates on local telephones by the Southwestern Telephone Company at Arlington, the Board of Trade of that city held a meeting and agreed to negotiate with another company to put in a system. As a result of this, J. C. Casler of the Independent Telephone Company met with the Arlington committee, and terms were agreed upon. A franchise will be asked for by the new company, which, it is understood, will be granted by the City Council, opening up the way for the establishment of a new exchange.

COLVILLE, WASH.—An application of the Farm and City Telephone Company of Kettle Falls for a franchise over the county roads in the Columbia river valley has been filed with the county auditor and the petition set for hearing on August 25.

CONSTRUCTION.

ROME, GA.—Fifteen residents of the Seney, Silver Creek and South Lindale communities will soon be brought in telephonic connection with Rome and with each other. The county commissioners have granted the petition of W. G. Dunahoo, Rounsaville's Mill, Dr. Cheney, Jas. Bobo, Mr. Bradshaw of Seney, and others, to allow them to erect poles. Work on the new line will begin at once and will be finished within a few weeks.

MECHANICSBURG, IND.—The Mechanicsburg, Markleville and Emporia Telephone Company is making extensive additions to its system in this vicinity and a large number of new poles have been placed.

SAUERS, IND.—Local residents are agitating the establishment of a telephone system in this vicinity.

FORT MADISON, IA.—Manager James W. Boling of the Mississippi Valley Telephone Company states that an extension of the Fort Madison telephone system is about to be made. The line will be extended 18,000 feet and the cable for this purpose has been received here.

KINSLEY, KAS.—G. W. Watson, who owns a majority of the stock of the Kinsley Automatic Telephone Company, is selling his interests to Dr. DeTar and E. T. Bidwell. The new owners of the telephone plant will make many changes in the present system and greatly improve and enlarge it.

PINE TOP, KY.—The Carr's Fork Telephone Company is preparing to build a ten mile extension to Brinkley and a new eight mile line up Breeding's creek. The capital stock has been increased to $3,000. S. R. Blair is manager.

PIKEVILLE, KY.—The Eastern Kentucky Home Telephone Company has started construction work on a thirty mile line to Clintwood, Va., to connect with Grundy, Big Stone Gap and Norton, Va., in the coal fields. A twenty mile line will also be built to Shelby Creek. N. Starkey is manager.

GRAND RAPIDS, MICH.—The Citizens' Telephone Company has let a contract for the construction of a branch exchange in Grand Rapids. Automatic service will be installed, and the branch connected with the main office by a trunk line.

MARENGO, MICH.—The Marengo Prairie Telephone Company held a special meeting recently, the object of the meeting being the extension of the line. The vote of the stockholders was unanimous and the work of extension will commence at once.

UNIONVILLE, MICH.—Under the supervision of Mr. Boline, the Saginaw Valley Telephone Company of Saginaw is making extensive improvements in its local plant. Cables carrying fifty and twenty-five pairs of wires are being installed to take care of the village line and a new and larger switchboard is being placed in Spring's drug store. A line has been run to Bay Park and Wisner, several farm lines have been erected, and when completed 100 subscribers will be connected.

BERTHA, MINN.—The Hewitt & Wrightstown Telephone Company is making many improvements in its system, and plans the purchase and installation of a new switchboard at once.

CASECADE, MINN. (R. F. D. from Northfield).—Permission has been granted to the Northfield Telephone Company for the construction of its lines in this city.

CULBERTSON, MONT.—The Montana Star Telephone Company will construct a line across the Fort Peck Indian Reservation.

BAINVILLE, MONT.—The Northern Telephone Company is considering the proposition of installing a central office in Bainville.

LINCOLN, NEB.—The Long Distance Independent Telephone Company of Nebraska is planning a systematic connection of all the Independent plants in that state.

LACONIA, N. H.—The Citizens' Telephone Company is making many improvements on its construction work in the vicinity of Tilton. Many new poles ire being erected and new wires are being strung. Local Manager H. W. Muzzey is in charge of the work.

TRENTON, N. J.—The directors and large bondholders of the Interstate Telephone Companies of New Jersey met recently to consider a number of important matters pertaining to the extension of the company's business. Resolutions were passed regarding the extension of the company's lines in northern Jersey and for the extension of the lines of the Atlantic City and Ventor plants.

LITTLE FALLS, N. Y.—The Interstate Telephone Company is about to establish a toll line between St. Johnsville and Little Falls.

HETTINGER, N. D.—An Independent telephone company has been organized which will be known as the Hettiger Telephone Company. E. M. Shannon, of Sanborn, is interested. A line will be built to Lemmon

PISEK, N. D.—A telephone exchange is being installed in this city by Milton Code of Grafton.

MICHIGAN, N. D.—A. T. Baird of Williston has taken charge of the construction of a new farmers' telephone line.

VERONA, N. D.—A telephone line is being constructed to the farmers in the north by the West Verona Telephone Company.

SHERWOOD, N. D.—The Pioneer Telephone Company is extending its line across the Mouse River.

EDGERLEY, N. D.—An Independent rural telephone line is being constructed in Swe le township by John Gottfried, Rudolph Ogren, Herman Davidson and Anton Johnson.

ASHLEY, N. D.—The citizens of this village are agitating the extension of the Dakota Central Telephone Company's line.

CANDO, N. D.—J. C. Rader is extending his telephone lines.

AMHERST, OHIO.—The lines of the Amherst Telephone Company will be extended to South Amherst, and the entire plant overhauled and put in first-class shape.

FREYSTOWN, PA.—The Rural Telephone Company is extending its line to Shirksville and Fredericksburg to farmers and patrons along the lines.

CORSICA, S D.—Peter Van Zee has the contract for the construction of the new telephone line along rural route No. 2.

NASHVILLE, TENN.—The Nashville Telephone Company has commenced the construction of a telephone line from Nashville to Doyle, Bolton and Westbrook, giving the farmers connection with the Nashville exchange. A line has been in operation from that place to each of those towns for some time, but it was a toll line, connections being had with the farm houses in the country.

DALLAS, TEX.—Representatives of the new Independent telephone company, to which a franchise was granted by referendum vote in April, declare that work on the new system will begin before the time fixed by the franchise. The franchise holders have made a deposit of $10,000, guaranteeing compliance with the various sections of the charter. The ordinance provides that work shall have begun within six months from the time of final passage.

DIMMITT, TEX.—Herman Heidgerken is investigating local conditions in the interests of the Nazareth-Tulia telephone line. If enough patrons can be secured the line will be extended to Dimmitt. If the line is extended it will necessitate a central office here and prove of great benefit to the people. The telephone line is known officially as the Castro Telephone Company. Frank Saalfield is president, B. H. Kleman, treasurer, and Frank Woelfile, secretary.

FREELING, VA.—The Wise Telephone & Telegraph Company, which operates the telephone exchange in Clintwood, and the various lines in Dickenson county, is contemplating some substantial improvements in its system. The lines will be rebuilt from Coeburn to Clintwood, and a metallic circuit is to be installed. The work will be commenced early in September.

BELLINGHAM, WASH.—J. T. Rumstead is completing negotiations with the farmers for the purpose of establishing a line on Lummi Island, to connect with the telephones in the city and county.

GARLAND, WIS.—There is agitation for the extension of the Farmers' Telephone line to Garland via Stokes and Nerssen.

PERSONAL.

BARLOW, N. D.—L. C. Billings will have charge of the new telephone exchange of the Farmers' Mutual Telephone Company, which is nearing completion.

AMHERST, OHIO.—William Roe has been elected manager of the Amherst Telephone Company, to succeed H. N. Steel, resigned. Mr. Roe has had several years' experience with the Home company of Elyria.

PALESTINE, TEX.—D. E. Bostick, for a long time superintendent of the Palestine Telephone Company, has resigned his position and Edwin Ferrin has been appointed to succeed him.

ELECTIONS.

BLENCOE, IA.—The stockholders of the Blencoe Telephone Company met recently and elected a board of directors for the coming year. The directors are the same ones chosen when the company was incorporated—B. H. Danforth, W. G. Baker and E. A. Shea.

WINONA, MINN.—The annual meeting of the Interstate Telephone Company was held at La Crosse recently and the following officers were elected: President, J. A. Tawney; vice-president, P. E. Baumgartner; secretary and treasurer, Otto Troost.

STAFFORD, VA.—The Toluca & Fredericksburg Telephone Company has elected the following officers: Hugh Adie, president; C. A. Bryan, secretary; T. J. Walker, treasurer.

BROCKVILLE, ONT., CAN.—At the organization meeting of the Leeds and Grenville Independent Telephone Co., held at North Augusta, the following directors were elected: Messrs. Connell, Simpson, A. Bissell, J. H. Dawson, Perry Bissell, G. W. Chapman and C. L. Johns. The directors selected as officers: President, J. H. Dawson; vice-president, Perry Bissell; secretary, R. E. Grigg; treasurer, G. W. Chapman; managing director, C. J. Johns.

MISCELLANEOUS.

GOLCONDA, IOWA.—A. B. Clanahan has sold his telephone system to G. C. Earl and Roy F. Smith, of Lake City, Iowa. The company was reorganized, W. H. Moore, G. C. Smith, Roy F. Smith, Earl Smith and F. B. Clark being elected directors. Roy F. Smith will have full control of the business.

WEBSTER CITY, IA.—The Martin Telephone Company of this city has replaced 2,100 feet of cable inside the corporate limits of the city.

ANAMOOSE, IA.—Jones County Telephone Company has purchased the system of the Independent exchange and toll line of Wyoming.

GLASGOW, KY.—The new Glasgow Home Telephone Company, owned by fifty local stockholders, has completed its full metallic system and is open for business here.

THORNTON, KY.—The Sergent-Ola Telephone Company has been changed to the Thornton-Colly Telephone Company. John S. Webb is manager and the capital stock is $500. An extension to Hibbard was recently completed, and further work will be undertaken immediately.

WILLIAMSBURG, KY.—A fire at this city was responsible for the destruction of the telephone exchange owned by Mr. John Woodward, the loss being estimated at $1,000.

BURR OAK, MICH.—The Southern Michigan Telephone Company has acquired by purchase from the Northern Indiana & Southern Michigan Telephone, Telegraph & Cable Company all its property in southern Michigan, including the two exchanges of Constantine and White Pigeon, located in St. Joseph county, and the Everybody's Telephone Company's property, including the exchange at Litchfield, Hillsdale county, and connecting toll and rural lines.

COLERIDGE, NEB.—The O. H. West telephone system has been sold to Charles Fleemer, a farmer living a few miles east of town.

WOODBURY, N. J.—Farmers living in the western part of Gloucester county are engaged in a controversy with the Bell Telephone Company over rates and threaten to build a line of their own to Woodbury to connect with the Keystone company. Last year the farmers signed contracts for telephones at the rate of $12 per year. They say the company agreed not to increase the rate for at least five years. Now representatives have appeared with new contracts and want $18.

NORWICH, N. Y.—The Marquis Telephone Company of this place suffered a loss of $5,000 by fire recently. The damage was mostly confined to the terminal room, although the switchboard was somewhat damaged by water.

ENDERLIN, N. D.—The Moore & Liberty Telephone Company of Enderlin has purchased and absorbed the Enderlin Telephone Exchange Company, and will operate the exchange in connection with its rural lines, taking possession Sept. 1. E. O. Fawcett is president; M. A. Abbott, manager.

LIDGERWOOD, N. D.—The Lidgerwood Rural Telephone Company will install about $300 worth of new fixtures.

PEMBINA, N. D.—The Pembina Mutual Telephone Company system has been enlarged.

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Telephone Exchange Contractors and Engineers
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And want advertisements not exceeding twenty words, exclusive of address, will be inserted in these columns for $1.00 each. For over twenty words, the rate will be 5 cents per word.

WALTER C. POLK

TELEPHONE CONSTRUCTION ENGINEER

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742 Ohio Building TOLEDO, O.

We have on hand newly manufactured, guaranteed apparatus of all makes

Telephones, Switchboards and Supplies

which we can sell to you at a reduction of 40% to 50% in price. Write us to-day

We rebuild all kinds of telephone apparatus. Make it as good as new
Consult our repair department.

Missouri Valley Telephone & Electrical Construction Co.

123-25 West 6th St., Kansas City, Mo.

FOR SALE—A substantial interest in a good telephone enterprise in one of the best Middle Western cities. Good reasons for selling. Full information on application provided you mean business. References required as to financial standing and telephone experience. Address "New Enterprise," care TELEPHONY.

FOR SALE—The whole or half interest and 3 small exchanges, consisting of several hundred telephones and 300 miles toll lines. Good paying telephone property, located in the South. Owner has not the time to look after it. Address T., care TELEPHONY.

FOR SALE—An interest or control in a telephone system in Middle West. Four exchanges; 6,000 subscribers. Good reasons for selling. References as to financial ability and telephone connections required. Address "Telephone," care TELEPHONY.

MR. TELEPHONE MAN, have you got $5,000 to invest? If so, I can sell you a half interest and three (3) small exchanges, including several hundred telephones and 300 miles of toll lines, paying handsomely. Owner wants to retire; come to the sunny South and take charge. Address W., care TELEPHONY.

WANTED—Position as troubleman by young man aged 23, sober, 7 years' experience in various branches telephone work. Address No. 505, care TELEPHONY.

WANTED—A composite specialist employed by a prominent company can furnish a few composite, phantom, or telegraph sets very reasonable. Address No. 504, care TELEPHONY.

WANTED—Position as exchange manager. Am a thorough telephone man and a good banker. Aged 28 years. For references write T. H. H., Leeds Bank, Sioux City, Iowa.

WANTED—By first-class all-round telephone man, with 10 years' experience, a position as wire chief or superintendent of exchange of 1,000 or more—any location. Best of references. Can come on short notice; always on the job when most needed. Address No. 506, care of TELEPHONY.

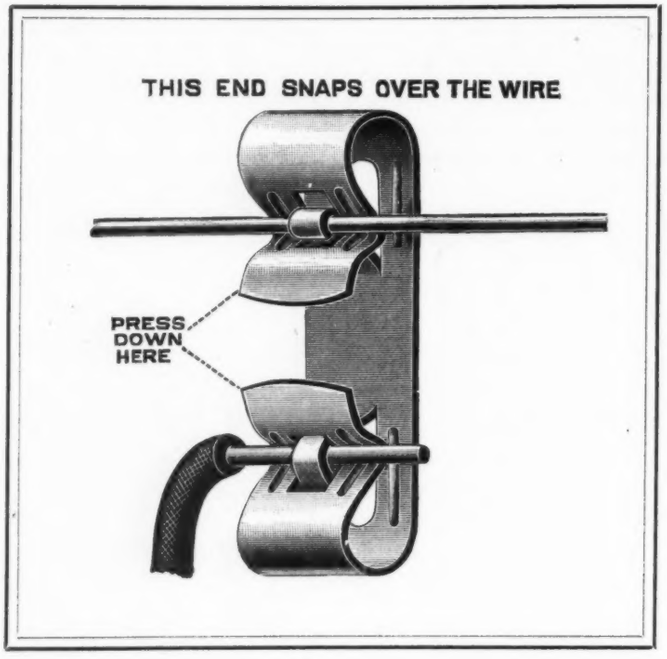
WANTED—Electrical or mechanical specialties to manufacture. You may have an idea worth millions. Why hesitate? Write today. Central Service Co., Canton, Ohio.

FOR SALE—One high grade new and one second-hand Queen Acme Testing. The new set is arranged for all tests known in telephone work, Murray & Varly loop, capacity, insulation and resistance measurements, etc. Write today to J. P., 5262 Jefferson street, Philadelphia, Pa.

POSITION wanted as manager or superintendent of a telephone exchange or system of exchanges. Eight years' experience, technical training, and a practical knowledge of the different branches of the business. Address No. 507, care TELEPHONY.

WANTED—Manager for Independent telephone exchange, one who has had experience with automatic system and understands common battery system preferred. Plant has 600 automatic telephones and 300 manual single party. Address A. W. Hall, Jonesboro, Ark.

Fahnestock "Snap Over" Connector



For connecting drop wires to the main line. One end of the connector snaps over the line wire. No dead end required. Just the thing for connecting bridging phones to party line wires.

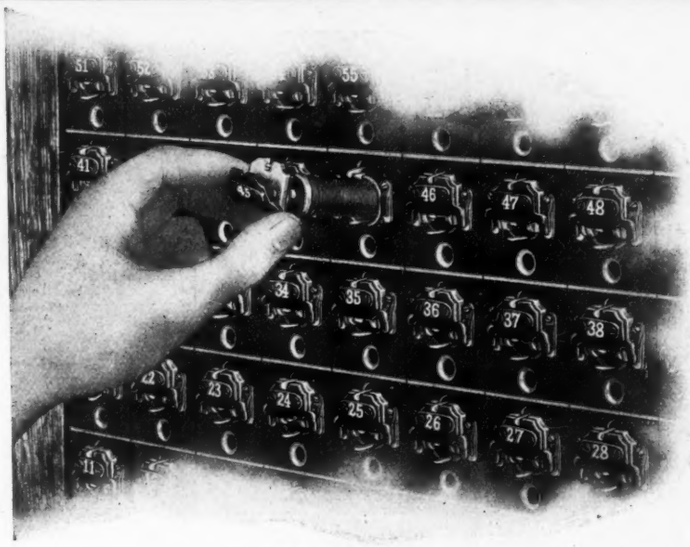
Can not possibly injure hard drawn copper wire
No tools required to make connection
Nothing to lose. Positive spring contact

Made for connecting iron to iron wire, copper to copper wire or copper to iron or iron to copper wire.

Send for sample. We make a number of different styles of spring binding posts.

FAHNESTOCK ELECTRIC CO.

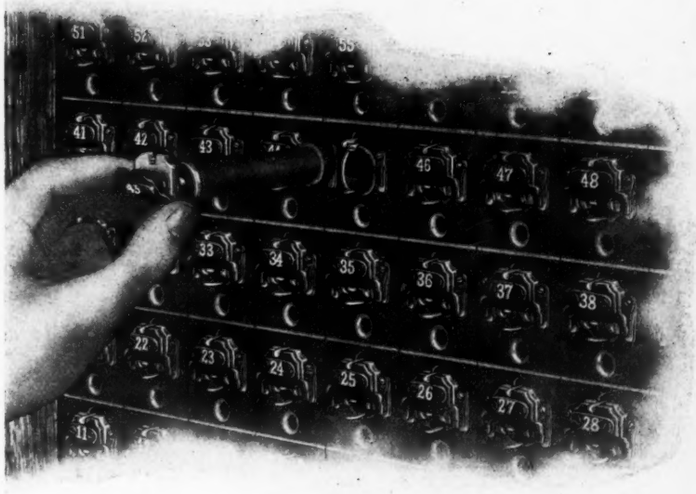
129 Patchen Avenue, BROOKLYN, N. Y.



REMOVING COIL

THE illustration to the left shows coil being removed from front of switchboard which can be instantly accomplished by the simple releasing of small spring immediately below drop armature; does not in any way interfere with any other part; can be as quickly replaced in position, and all chances or poor contact or leakage are absolutely eliminated.

THE illustration to the right shows coil removed. This need not necessarily disturb or interfere with service of the subscriber; by inserting plug in corresponding jack subscriber can signal central through clearing out drop; operator can signal subscriber as well with coil out as in. This is an exclusive *Swedish-American feature.* There are other features you should know about. If you are in the market for a new board you will find it to your interest to consult us before placing your order.



COIL REMOVED

¶ If you contemplate the purchase of new central office equipment we solicit your inquiry. Our Magneto switchboards have original and distinctive merit, easily and quickly recognized by everyone who investigates. We will gladly send you literature showing different types of switchboards.

¶ Our facilities place us in position to make prompt deliveries and our price will interest you, quality considered.

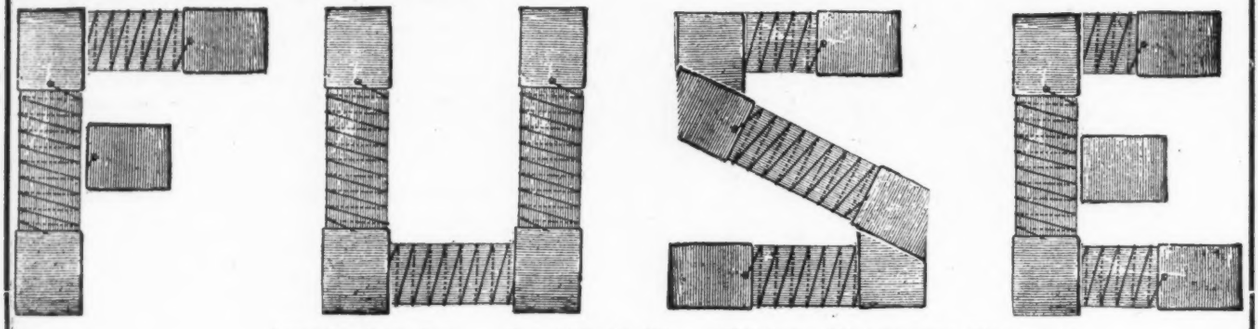
SWEDISH-AMERICAN TELEPHONE CO.

KANSAS CITY, MO.————————CHICAGO

USE THE BEST COSTS NO MORE

6 times the fuse length
18 sharp angles for impedence
Special wire accurately rated, not easily broken. Tinned copper terminals, can be used on any standard W. W. block

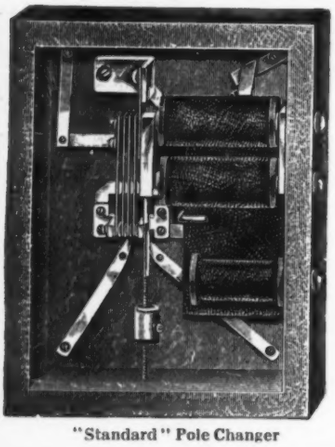
No. 1 Patent Wrapped



Length, 2 inches. Per 100, $1.25. 500 lots, 10 per cent discount

Order of Your Dealer
or of
CENTRAL
TELEPHONE &
ELECTRIC CO.
ST. LOUIS - DALLAS

P. S.—Our Bulletin 28 shows complete line of lightning protective devices. All good. Like all our bulletins free for the asking.



"Standard" Pole Changer

Use the "Standard"

THE STANDARD POLE CHANGER

Absolutely Guaranteed

Simple, efficient, economical. Only one battery of forty to fifty ordinary dry cells required. Works perfectly on all alternating and direct pulsating current ringing. Sent on 30 days trial. **Present Price only $15.00**

THE STANDARD DUPLEX SET

Another Money Saver

By using this instrument you can carry on two conversations over any single, metallic bridging line without either conversation interfering with the other. Let us explain it to you. Sent on 30 days trial. **Price complete, per set, $15.00.**

We guarantee both of the above devices to be of the very highest standard. They have successfully withstood all tests of actual service and the keenest competition. The prices are attractive and the terms all that could be asked. **We want every telephone man to have full particulars.** Have you our descriptive matter? If not, send us your address.

CURRENT ELECTRIC CO., 50 State Street, CHICAGO

THE PARAGON BATTERY BOX

Protects your batteries, prevents broken connections and provides a neat receptacle for unsightly exposed batteries in desk or hotel type magneto telephones.

F. W. PARDEE, Mfr.

52 FIFTH AVE. CHICAGO

WILLIAMS TEST CLAMPS

Will pay you a fine profit in the saving of labor and material. They save skinning—they save re-taping—they save time—they save the wire. Send 75 cents for a pair (two), on 30 days' trial. Your money back if you want it.

The Williams Test Clamp Co.
720 Electric Bldg. Cleveland, O.

Let's Get Acquainted!

Until September 15th Only, We Offer You a Straight

10 PER CENT. DISCOUNT

on our No. 1 and No. 2 Bipolar Receiver, No. 4 Testing Receiver, and No. 7 Operator's Head Receiver.

Your company may not be on our books—we want to reach you through this offer and make you one of our many satisfied customers.

We Want You to Join the Ranks of Ericsson Customers

who always get "VALUE RECEIVED" and a "SQUARE DEAL."

ERICSSON receivers are the standard of the world—if you're in need of receivers we figure that you'll buy these. Assuming that you do, we've **gained a customer that we'll never lose,** while you've **saved money and gotten the best receivers obtainable.**

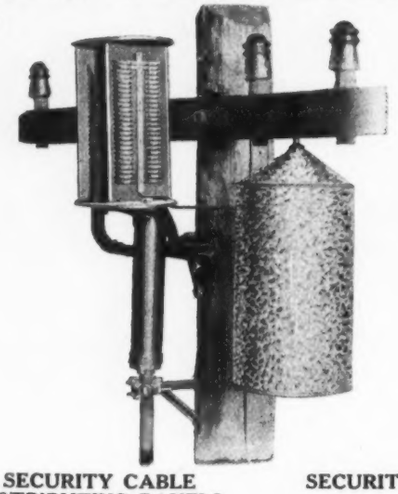
Send in your order at once—delays are dangerous.

This offer expires September 15th.

L.M.ERICSSON TEL.MFG.CO.
BUFFALO, N.Y.

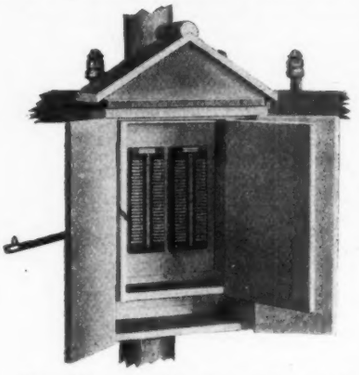
Security Specialties are Necessities and Economies

SECURITY CAN TOP TERMINALS—The Regular Security



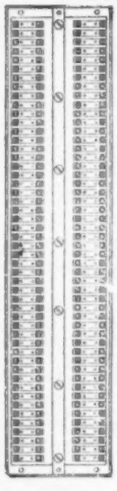
Can Tops—the Regular Security—fill the demand for **safety at low cost.** We make them with potheads combined at 50 cents extra.

SECURITY CABLE POLE HOUSE, No. 1



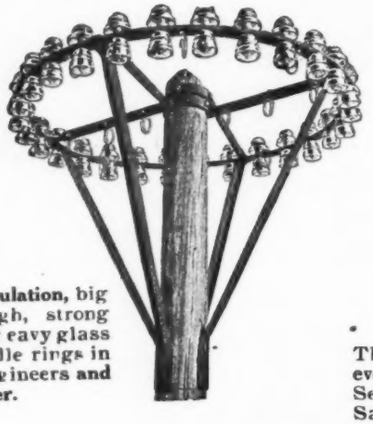
Pole Houses will always be used. This is our No. 1, **our best design** and moderate in price.

SECURITY CABLE DISTRIBUTING PANELS



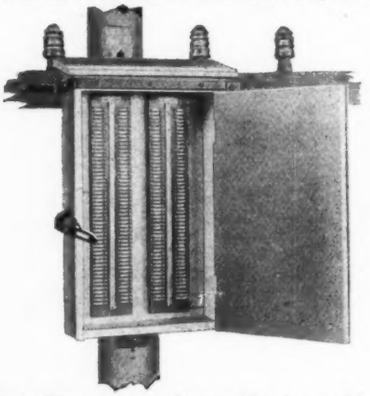
The Distributing Panel is shown enlarged at the right. Thousands are in use and entirely satisfactory **at ten cents a wire,** including the fuse.

SECURITY DISTRIBUTING RINGS



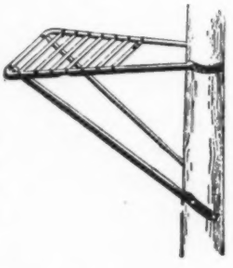
Pole Rings with **real insulation,** big enough to climb through, strong enough to support sleet; heavy glass on wooden pins and bridle rings in plenty. They interest engineers **and the price suits the manager.**

SECURITY CABLE POLE HOUSE, No. 2



The Pole House above is our No. 2, good in every way and **very low priced.** It takes the Security Distributing Panel, or any other. Same hardware as No. 1 above.

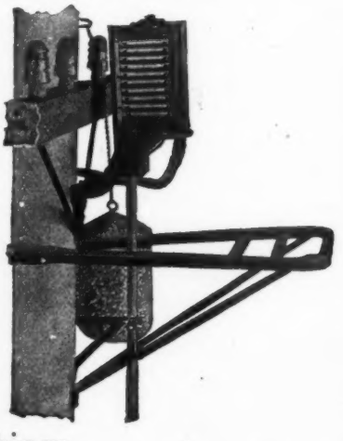
SECURITY POLE SEAT, No. 1



Pole Seat No. 1 is right for pole houses; extends 36 inches; rims bent without notching; seven cross slats; sturdy braces; **nothing as good.**

THE HIGH TENSION SECURITY CAN TOP AND POLE SEAT, No. 2

Here is where high tension troubles are met by prices within reach, and the **fuse renewals at four cents each** do not mortgage the plant. Nothing better made at any price.



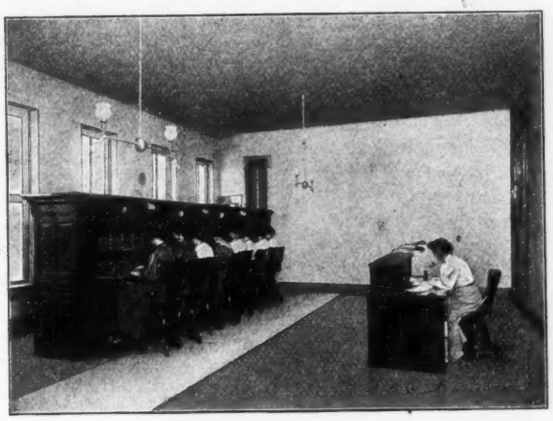
Pole Seat No. 2, for can tops, extends 27 inches; two slats; all iron; no wood to warp and rot; priced ridiculously at $1.25 each. plain, and $1.50, galvanized. Two braces; can't twist.

SECURITY HIGH TENSION ENCLOSED FUSE

Security Booklet No. 6 tells more and it shows other things which interest you right now for convenience, quality and price. Get the book.

THE F. BISSELL COMPANY

TOLEDO, OHIO



Dean C. B. Multiple Board at Mt. Vernon, Ohio.

Manual vs. Mechanical

From the Subscriber's standpoint the most complete labor saving service is obtained with the best manual telephone exchange—the Dean Common Battery Multiple Switchboard.

The Mere Removal of the Receiver from the hook makes the call. Replacing the receiver insures immediate disconnection, in the most simple manner.

The Human Element—the operator—is as necessary, and not as expensive, as the many trouble experts required to maintain any mechanical exchange.

The Poorest Operator, with her continual application to simple duties on a Dean Board, is at least on a par with the most careful subscriber who makes his own connections.

Expert Supervision of telephone service is absolutely necessary—the best results cannot be obtained where the subscriber is his own operator.

The Average Service on a Dean switchboard is therefore far superior to the best service obtained with any other system.

The Results need no argument.

Labor Saving Devices on Dean manual switchboards make the work of connecting and disconnecting more positive, rapid and accurate than is possible with a mechanical or any other switchboard.

The Smallest Possible number of switchboard parts, in proportion to the number of subscribers served, is what makes the cost of Dean exchange upkeep practically nothing.

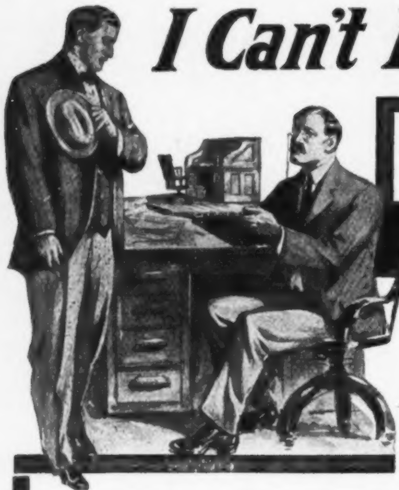
This is True also of subscribers apparatus. Simplicity of equipment is vital to good service and to economic maintenance. The high grade, superior design and expert construction of Dean apparatus has never been questioned.

Taking these Facts into consideration is it not reasonable to count on the most profitable return from investment in a Dean exchange?

The Dean Electric Company

San Francisco **Elyria, Ohio, U. S. A.** **Kansas City**

I Can't Fill It



If a good position were offered *you* today, would you have to "turn it down" because you lack the necessary qualifications? Even if you accepted the position, could you hold it—or would your lack of training compel you to step out in favor of a *better* trained man?

How can you expect a successful career unless you build it on a good foundation? *Utilize your spare moments—study at home*—fit yourself *properly* to meet opportunity—then you will succeed. The American School of Correspondence will tell you how if you'll clip the coupon and mail it *today*.

SPECIAL HELP FOR TELEPHONE WORKERS

The AMERICAN SCHOOL OF CORRESPONDENCE has given hundreds of Linemen, Instrument Men, Switchboard Men, Exchange Men, Trouble Men, Telephone Engineers, Electricians, Draftsmen, Inventors, and Patent Lawyers just the special training which they needed to qualify for lucrative positions. Our courses in Telephone Practice, Telegraphy, Electrical Engineering, and Drafting are as complete and practical as they can be made. Besides giving the most comprehensive instruction in the usual work, we teach the operation and construction of the *Automatic Telephone.*

We employ no agents. We talk to you only by mail. The money you pay us is not used to maintain an expensive organization of high-priced agents, but is used to give you the *best* instruction at the *lowest* cost.

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Telephony 9-5-08.

American School of Correspondence, Chicago.

Please send FREE 200-page illustrated handbook describing over 60 courses. I am interested in the course marked X.

—Telephone Practice
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Name..

Address..

Occupation..

Matthews.' Matthews.' Matthews.' Matthews.'

Matthews' Cable Rollers

(Formerly called Callahan)
(Patent Applied For)

They will save their cost every time they are used to put up 5,000 feet of lead covered cable.

They have no sharp edges to injure cable sheath; no bolts or nuts to work. They can be clamped on the messenger immediately.

W. N. Matthews & Brother

Manufacturers of Matthews' Patented Money Saving Specialties

218 N. 2nd Street :: ST. LOUIS

If it is made by Matthews it must be a Money Saver

Matthews.' Matthews.' Matthews.' Matthews.'

We Carry for Immediate Shipment

Capital High Speed Steel
Capital High Speed Twist Drills
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Hardened and Tempered Strips
Drill Rods
Dental Octagons
Roller Bearing Rods
Oil Tempered Wire
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Tinned Wire
Cast Steel Binding Wire
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Send for Catalogue of Nash Salt Bath Tempering Furnace and our Steel Catalogue

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TELEPHONE EQUIPMENT
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One's like "New," the other's "Old"—always will be

Our "Rebuilt" Equipment Department "Rebuilds" Switchboards—Telephones—Apparatus—Additional Switchboard Equipment—and Handles Wire—Cable—Cords—Everything Telephonic.

GUARANTEED SAVING 30 TO 50 PER CENT

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PREMIER ELECTRIC CO.

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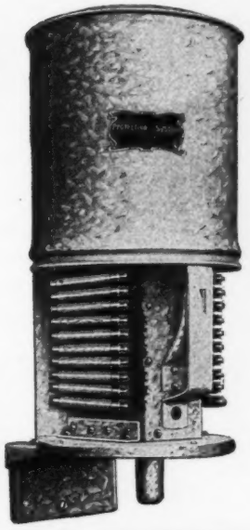
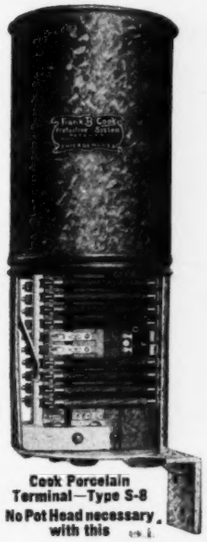
COOK TERMINALS AND JUNCTION BOX

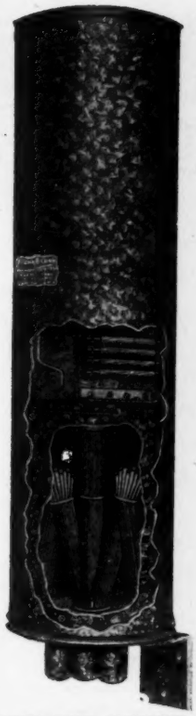
COOK PORCELAIN TERMINALS



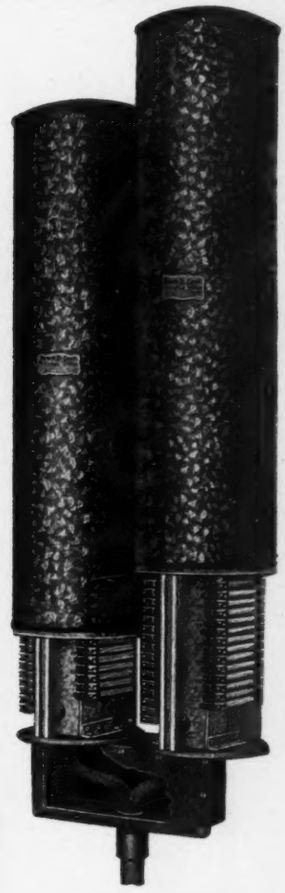
COOK ALL-STEEL TERMINAL
TYPE S-6
No Pot Head necessary with this



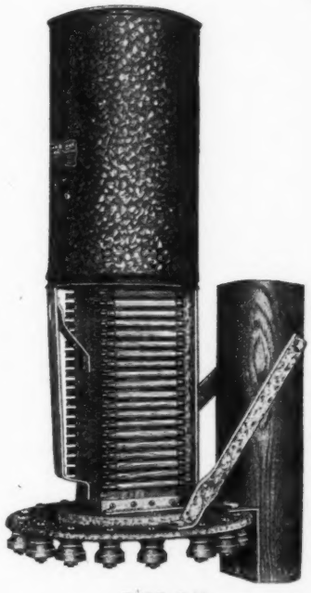
Cook Porcelain Terminal—Type S-8
No Pot Head necessary with this



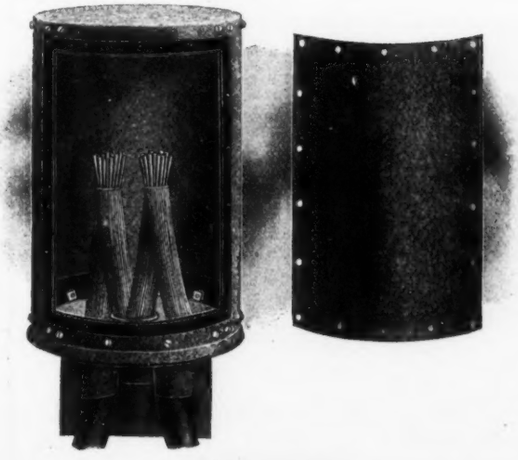
COOK NEW JUNCTION BOX AND TERMINAL COMBINED



TYPE S W—TWIN COOK POLE CABLE TERMINAL



TYPE S-7
COOK POLE CABLE TERMINAL



COOK SHEET STEEL JUNCTION BOX

IF it's quality, not quantity, you're seeking, if you want apparatus that has been designed by experienced telephone men who don't have to experiment, then here's the line for you.

Plug in and we'll talk it over.

Frank B. Cook
MANUFACTURER
of TELEPHONE PROTECTIVE APPARATUS
CHICAGO ILLINOIS
242 WEST LAKE STREET

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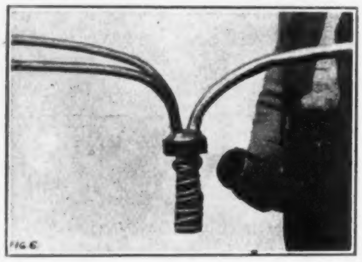

Matthews' Cable Joint

(Formerly called Hargis Joint)

If you have lead covered cables to splice and want to have a complete mastery over them after they are laid or strung, if you want a flexible distribution, if you want to get at the contents of your cables at some later date without expense, you cannot help but be interested in Matthews' Cable Splicing Joints which have all of these advantages and many others.

Patent Number 802337

W. N. Matthews & Brother

Manufacturers of Matthews' Patented Money Saving Specialties

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If it is made by Matthews it must be a Money Saver

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TELEPHONE CABLES

TELEPHONE WIRE

WIRE ROPE
WIRE STRAND

JOHN A. ROEBLING'S SONS CO.

TRENTON, N. J.

PREMIER STEEL CORD

ALWAYS IN ALIGNMENT

In the hollow of the cord at the plug end, there's a reinforcing spring made of the highest grade spring steel. Not only does this prevent the conductors from being thrown out of alignment, but it also makes it practically impossible to break the cord at the plug end, and that's where the strain is greatest. Operators don't have to be careful when you use Premier Steel Cord—it'll last in spite of shamefully careless usage. Better get details.

Runzel-Lenz Electric Mfg. Co.

97-101 South Clinton Street, Chicago

IRONITE

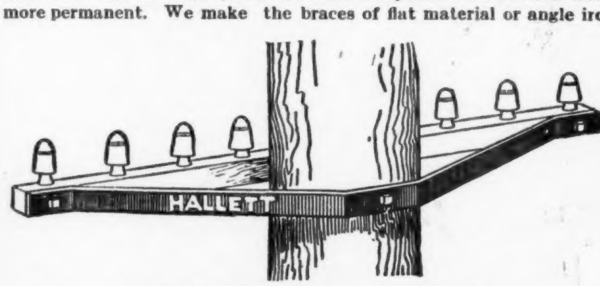
No matter how low the price of copper may be IRONITE is always cheaper, stronger and better. Ask for a free sample.

DURANT ELECTRIC SUPPLIES CO.

52 FIFTH AVE. :: :: :: CHICAGO

CROSS ARM BACK BRACES

hold the cross arm rigid, which makes Telephone construction work more permanent. We make the braces of flat material or angle iron



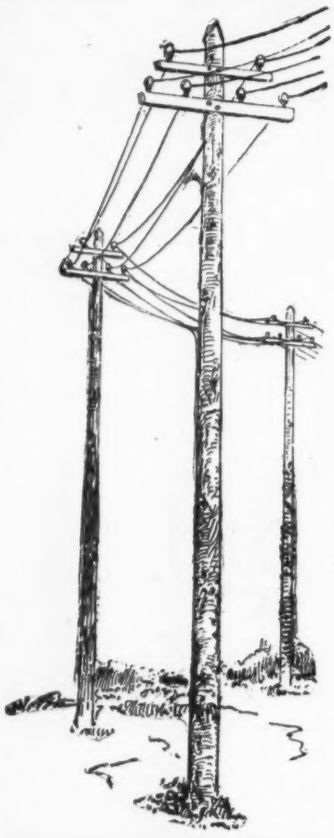
HALLETT IRON WORKS

92-96 W. Polk Street, CHICAGO, ILL.

American Steel & Wire Company's

W. & M. Telephone Wire

IS made of materials selected and tested in all the stages from our own mines to the finished product. The employment of specially adapted metals is of greater importance in telephone wires, because not alone must tensile strength be considered, but electrical conductivity as well. To attain both these and in addition apply a quality of galvanizing that will effectually protect against weather conditions, is a triumph of the wiremaker's art. It is accomplished only with the greatest facilities for manufacture and an organization trained to the highest standard of excellence. Our brands illustrated below represent the best that experience, skill, facilities and hard and painstaking study can produce.



National Pole Company

Escanaba, Michigan

Successor to the Cedar Department of the

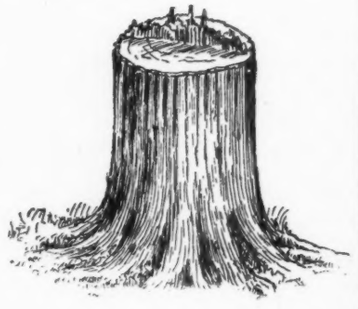
PITTSBURG & LAKE SUPERIOR IRON CO.

Producers and Shippers of

CEDAR POLES

From the Stump to the Line

We carry large stocks of Poles at various points in the States of Michigan, Wisconsin, Minnesota, Idaho, Washington and Maine, and are in position to make immediate shipments at lowest prices and freight rates.



WHITE CEDAR POLES

A Large Stock of

STRICTLY HIGH GRADE POLES

Send Us Your Inquiries

Wittenberg Cedar Co.

WITTENBERG, WIS.

WHITE CEDAR POLES

Prompt Shipment Best Grade

Standard Cedar & Lumber Co.

34 Security Building MINNEAPOLIS, MINN.

WHITE CEDAR POLES

Buy from the Producers
and Save Jobbers' Profits

PENDLETON & GILKEY - Minneapolis, Minn.

DOTY LUMBER AND SHINGLE CO.

Manufacturers of

Washington Fir
Cross Arms. Red
Cedar Poles and Piling
In any Length

PROMPT SHIPMENTS

Doty, Washington

POLES

WESTERN RED AND MICHIGAN WHITE CEDAR

LONG POLES A SPECIALTY

FARIS & MAYHEW LUMBER & POLE CO.

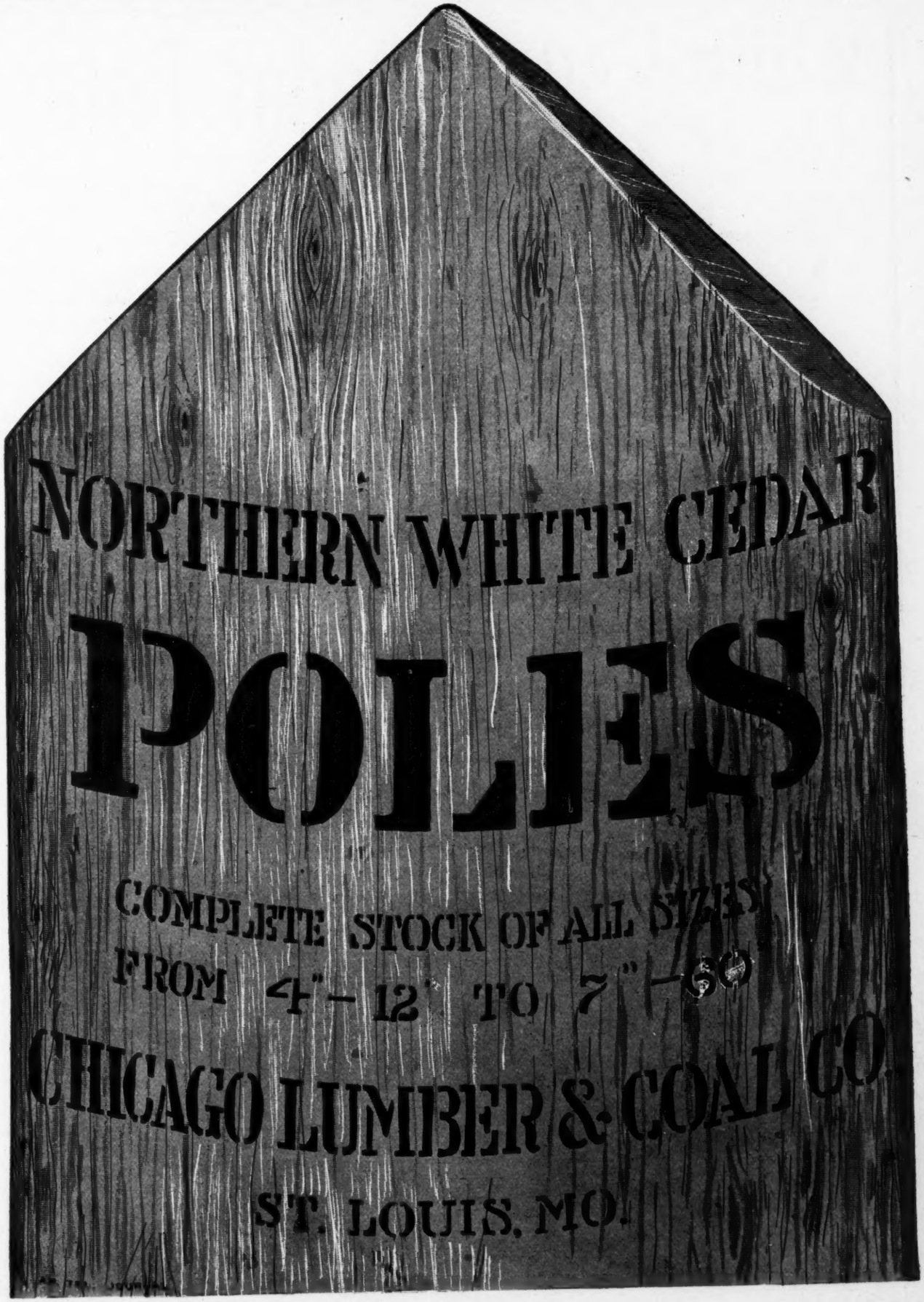
202 & 203 Continental Building, Denver, Colo.

POLES

NORTHERN WHITE CEDAR

Give best service. Our prices are lowest.
May we quote?

ITASCA CEDAR COMPANY. Deer River. Minn.


NORTHERN WHITE CEDAR
POLES
COMPLETE STOCK OF ALL SIZES
FROM 4"-12' TO 7"-60'
CHICAGO LUMBER & COAL CO.
ST. LOUIS, MO.

White Cedar

POLES

POLES

LARGE STOCK—14 to 65 ft.

Prompt Shipment

FRANCIS BEIDLER & CO.

CHICAGO, ILL.

YARDS:

Marinette, Wis. Escanaba, Mich. Superior, Wis.

Cedar Poles

LARGE BUTTS

We cut poles from lands owned by our Company in Northern Michigan on Lake Superior Shore, where the cedar is very **sound** and **stocky** with **heavy butts.**

All sizes in stock all the year round.

Write for a Copy of Our Telegraph Code for Cedar Products Giving Valuable Information About Poles.

C. H. WORCESTER CO.

1708-1710-1712 Tribune Bldg.

CHICAGO, ILL., U. S. A.

WE MAKE LOW PRICES ON

Idaho Red Cedar Poles

Michigan White Cedar Poles

8 YARDS IN IDAHO 2 IN MICHIGAN

Western Lumber & Pole Co.

Main Office Charles Bldg., Denver, Colo.

POLES 20 and 25 foot lengths for rural telephone lines a specialty.

PORTER CEDAR COMPANY

SAGINAW -:- MICHIGAN

POLES Red Cedar and White Cedar

Western Sales Agent—"C. A. WOOD PRESERVER"

WILL F. BRUER, 18 Walnut St., Kansas City, Mo.

The Valentine-Clark Co.

ERNEST L. CLARK, President

Michigan Western } **Cedar Poles Exclusively**

All stock concentrated in our main yards

Minn. Transfer, Minn. **Green Bay, Wis.**
Prentice, Wis. **Pinconning, Mich.**

MAIN OFFICE

234 La Salle Street **Chicago, Ills.**

The Wyckoff Pipe and Creosoting Co., Inc.

(Established 1881)

Manufacturers and Dealers in

CREOSOTED WOOD

Conduits for Underground Wires and Cables, Cross Arms, Poles, Guy Blocks and Lumber

Wood treated by our dead oil of coal tar process will never decay.

Office: 50 Church St., N.Y. City **Works: Portsmouth, Va.**

TELEPHONE EAR CUSHION Cuts Off All Outside Noises

Samples FORTY CENTS, Prepaid

This pneumatic cushion is made of the softest rubber and can be adjusted to the hard gutta percha receiver very readily. The cushion conforms to the exact shape of the ear as such an air pad alone could, cutting off outside noises and giving the ear a comfortable cushion instead of a rigid receiver. Holds the ear-drum further from the receiver, and by virtue of the air and flabby rubber cushion it neutralizes the harsh crash! crash! noises. Made by

HURON RUBBER COMPANY, CLEVELAND, O.

Evidence of our ability to meet all trade demands:

New customers constantly coming our way

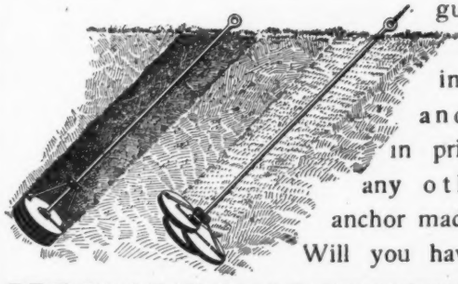
POLES

We have the "goods" and the facilities for supplying you promptly at right prices.

Duluth Log Company

General Offices: Second Floor, Palladio Bldg.
Duluth, Minnesota

The "EVERSTICK"



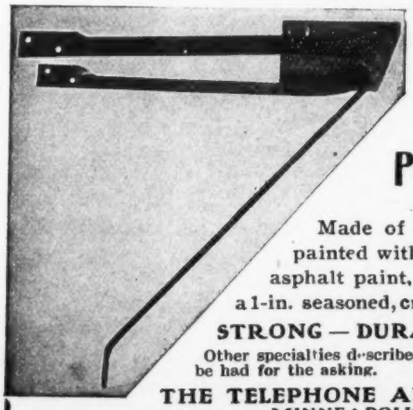
guy anchor is higher in efficiency and lower in price than any other guy anchor made. Will you have proof?

SPECIALTY SALES COMPANY
Cedar Rapids, Iowa

Michigan White Cedar POLES
WILL OUTLAST ALL OTHER KINDS

GET OUR PANIC PRICES. We can fill all sized orders from our own stock 150,000 ON HAND. Twenty-eight years have we been producers.

W. C. STERLING & SON CO.
Principal Office: MONROE, MICHIGAN
Yards: Bay City, Omer, Boyne Falls, Cass City and Monroe



$1.00 YANKEE POLE SEATS

Made of 1½-in. angle iron painted with a weather-proof asphalt paint, to which is bolted a 1-in. seasoned, creosoted, pine seat.

STRONG — DURABLE — CHEAP

Other specialties described in our bulletin may be had for the asking.

THE TELEPHONE APPLIANCE CO.
MINNEAPOLIS, MINN.

No Delay No. 3

CEDAR POLES

Shipped From Our Minnesota Transfer Yard in 24 to 48 Hours

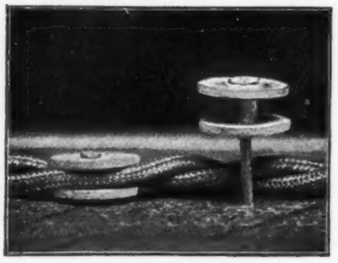
Page & Hill Co.
Minneapolis, Minn.

Eureka Fibre Insulators

A NEW STYLE

"PRICES TO POINT, WHERE IT IS ECONOMY TO USE THEM"

The value is in the method that they are attached without injury to the wire



Made in Three Types
50, 60, 70
¾", ⅞" and 1" long respectively

PRICES AND SAMPLES ON APPLICATION

Commercial Electrical Supply Co.

Fifteenth and Pine Streets ∴ ∴ ST. LOUIS, MO.

HENRY L. ELSTON, Pres.-Mgr. Established 1903

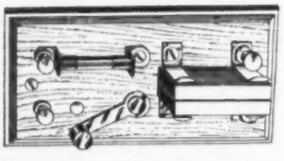
The Elston Telephone and Electric Mfg. Co.

Manufacturers and Jobbers of High Grade

TELEPHONES

ELECTRICAL SUPPLIES

MUSCODA WISCONSIN



Get our Prices on Telephones and Electric Supplies
Special Price on Telephone Brackets
USE
THE ELSTON LIGHTNING ARRESTER
A Guaranteed Protection
Write for Circulars and Prices

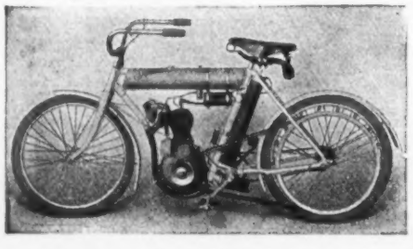
A TELEPHONE

Intelligently and honestly made will necessarily have trouble causes eliminated.
We manufacture such a telephone.
We also rebuild telephones; like persons, every old telephone has some good points. We take these good things, put good new things with them and make a good, new, rebuilt phone that costs you less money than a complete new phone.

WRITE US ABOUT IT

INDEPENDENT TEL. MFG. CO.
MADISON -:- -:- WIS.

ARMAC MOTOR CYCLE



MR. HELLO MAN—

Every day you are losing money when you don't use an ARMAC MOTOR CYCLE for trouble men

Write us today for the figures

ARMAC MOTOR CO.

472 Carroll Ave. CHICAGO, ILL.

Digging Pole and Anchor Holes

is quick, easy and inexpensive if you use the

IWAN POST HOLE AUGER

It is the fastest, easiest-digging post-hole digging tool on the market.

Works in every kind of soil except solid rock.

Our booklet "Easy-Digging," is yours for a word.

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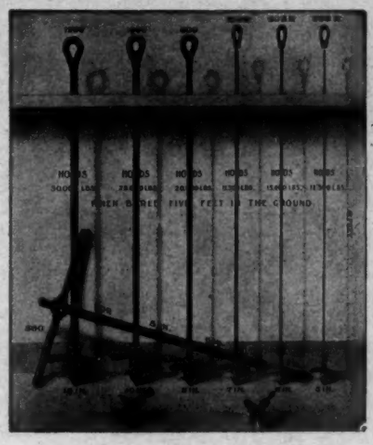
Matthews.' Matthews.' Matthews.' Matthews.'



Matthews' Guy Anchors

Made for every purpose for which a land anchor can be used. They screw into the ground without digging. No tamping. No creeping. Least expensive installed.

Patent Number 816,831

W. N. MATTHEWS & BROTHER

Manufacturers of Matthews' Patented Money Saving Specialties

218 N. 2nd Street, :: :: ST. LOUIS

If it is made by Matthews it must be a Money Saver

Matthews.' Matthews.' Matthews.' Matthews.'

Monnot Copper-Clad Steel Wire

COMPARISON

Monnot Copper-Clad Wire, Grade "A"	TENSILE STRENGTH:	Hard Drawn Copper
780 lbs.	No. 10 B. & S.	530 lbs.
512 lbs.	No. 12 B. & S.	333 lbs.
334 lbs.	No. 14 B. & S.	210 lbs.

Manufactured by

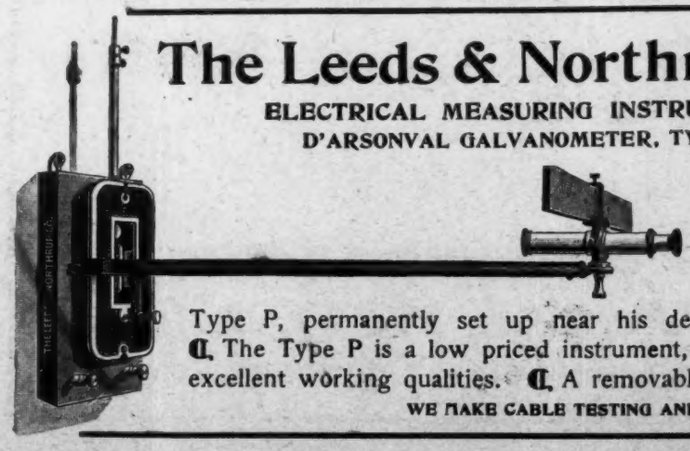
DUPLEX METALS CO. - 208 Fifth Ave., New York

The Leeds & Northrup Co., 4901 Stenton Avenue PHILADELPHIA

ELECTRICAL MEASURING INSTRUMENTS

D'ARSONVAL GALVANOMETER, TYPE P

Monadnock Block CHICAGO



¶ Your wire chief has use for a reflecting type D'Arsonval Galvanometer. His cable testing set will have a greater range if he can make insulation and capacity measurements with a reflecting galvanometer. With our Type P, permanently set up near his desk, he can make routine tests of insulation. ¶ The Type P is a low priced instrument, well made, of pleasing appearance, and has excellent working qualities. ¶ A removable damper converts it for ballistic measurements.

WE MAKE CABLE TESTING AND FAULT LOCATING APPARATUS

American Electric Telephone Co., Chicago

WE ISSUE THE FOLLOWING BULLETINS AND CATALOGUES

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" " 12—Visual Signal and Bell Style Switchboards.
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" " 15—Bell Express Self-Restoring Switchboards.
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INDEPENDENT LOCAL AND LONG DISTANCE TELEPHONE

Bulletin No. 18—Magneto Telephones of all Kinds.
" " 19—Central Energy Switchboards.
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" " 21—Protective Apparatus and Terminal Equipment.
" " 22—Construction of Country Telephones Lines.
" " 23—Eight-Party Selective Ringing Telephones.
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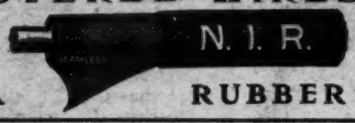
WE SEND THEM POSTPAID, WRITE FOR THEM

RUBBER COVERED WIRES AND CABLES

For all Classes of HIGH-GRADE ELECTRICAL SERVICE



42 Broadway, New York

NATIONAL INDIA RUBBER CO. BRISTOL, R. I.

Klein's New "Chicago Grip"

No. 358-A, for No. 6 Wire and Smaller

is made of steel forging, polished and nickel plated. It is a well-proportioned and reliable tool. The draw link is arranged so it does not fall in the way of the wire. It holds fast on iron or copper wire. Do not fail to have our Catalog on file. It is arranged with Code and List numbers for convenient ordering.

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MATHIAS KLEIN & SONS
87 W. Van Buren Street :: CHICAGO, ILL.

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EXPOSED CONDUCTORS IN STATION WORK BY

Flameproof Braids

Efficient—Low Cost

INSULATED
WIRES and CABLES
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THE SIMPLEX ELECTRICAL CO - BOSTON

LOOK FOR THE TAG
on Every Coil of

MONARCH

Special Brand Weatherproof Copper and Iron Wire and Cables. Scientifically Made. Stands the Most Rigid Inspection. Ask the user about it. If Your Jobber Cannot Furnish It Take No Substitute But WRITE TO US.

Monarch Electric & Wire Co.
Makers of the Wire with the Tag
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PATENT PENDING

ELKHART, IND.

PEIRCE
Test Connectors
Fit any size wire
HEX. OR WING NUTS for copper or iron
CHEAPEST—BEST

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OUR SPECIALTIES:
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The Blackburn Ground Clamp

can be attached in one minute to any size of lead or iron pipe at a cost of about five cents each. Our many satisfied customers agree that it is the most economical ground connector on the market. May we send you a sample?

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1404 West Third St. Cleveland, Ohio

THE SEYMOUR MFG. CO.
SEYMOUR, CONN.

GERMAN SILVER
RESISTANCE SHEET AND WIRE

COPPER WIRE
BRASS, BRONZE AND COPPER

A Time and Money Saver

Each Wire can be clamped Separately

M. & B. No. 8 TEST CONNECTOR

ONLY TOOLS REQUIRED ARE SCREW DRIVER AND WRENCH. SAMPLES AND PRICES ON REQUEST.

Milwaukee Electrical Specialty Co., Milwaukee, Wis.

Magneto LOUD RINGING Extension

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Size of gongs, 2½ in. to 10 in. All resistances. All weather proof. Efficiency, durability and price will interest you.

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